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skin diver

Volume Thirty-One Number Six

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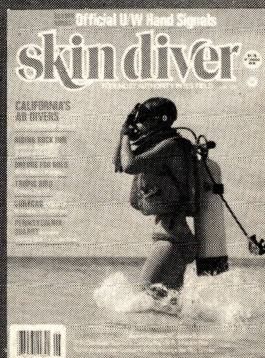
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COVER

Diver Shari Kurgis takes the plunge into the waters off the island of San Salvador in the Bahamas. This area is known for its excellent U/W visibility and fish action. The Riding Rock Inn offers easy access to these waters. For a full description of the resort and nearby dive sites see page 78. Photo/Geri Murphy.



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SDM Editorial

BY THE PUBLISHER

HOW DO YOU MEASURE UP?

Almost all new divers coming into our sport are eager to prove to themselves, and to their friends, that they are *good divers* — that they measure up to the highest standards of the sport. Quite often they will seek ways to test their mettle — perhaps some sort of underwater competition or accomplishment that will prove beyond a doubt their personal ability and skill for diving.

In the early days of skin diving, a man proved his worth by the size and number of fish he speared. Look back through the old-time pages of skin diving magazines printed in the 50's and you'll find many photographs depicting beaming divers holding up strings of dead fish.

Breath holding and prolonged free diving were other early day measures of dive skill. They went hand in hand with spearfishing and many a practitioner spent hours clinging to the bottom of a swimming pool ladder in an effort to improve his breath holding endurance. That was until the medical people blew the whistle and showed us how hyperventilation and overextension could easily result (and often did) in underwater blackout.

An equally insane yardstick of the hero diver is deep diving with compressed air. An astonishing number of misguided people have met with tragic endings during scuba dives to 270, 300, and even 320 feet! In the eyes of most veteran divers and instructors, these deep diving fatalities were senseless, needless affairs because depth is certainly no measure of a person's diving ability.

If it is not fish speared or depth dived, what then is the criteria for judging a person as a *good diver*? Or, more important, how do you spot a bad diver?

The qualities and characteristics which help to make a good diver are generally more subtle than a string of fish and one has to be a sharp observer to spot them. For example, it is not the magnitude of divers' sea stories nor the high grade on a final scuba course exam that proves an ability to dive. Instead, it is the

divers' actions in and around the water that provide the clues: How they prepare for a dive, how they conduct themselves underwater, and how they avoid accident situations. Here are a few of the signs to look for:

Physical condition — Good divers keep in good physical condition so that they can enjoy their dives and avoid panic situations. If they plan to make an unusually strenuous dive or go on a lengthy dive vacation, they prepare by working out at the pool prior to the trip. Good divers also know when to quit for the day. They know the limit of their own physical endurance and will not push themselves beyond this limit, regardless of how good the diving may be that particular day.

Proper equipment — Good divers show up for a dive properly equipped for that specific dive. If it happens to be a cave dive, then they have the special tools for the job — such as a safety line and reel, underwater lights, and pony bottle. There are a few basic pieces of dive gear that indicate the mark of a good diver: a submersible pressure gauge, a buoyancy compensator, a reliable depth gauge, and an octopus rig.

Good divers also maintain and repair their equipment on a regular basis: Washing it at the end of a day's diving and doing a pre-check of all their gear at least two days prior to the next dive. This provides sufficient time to repair or replace damaged equipment.

Underwater orientation — Good divers know exactly where they are during every moment of their dives, taking careful mental notes of underwater landmarks, current direction and velocity, and the time spent. They can always find their way back to the boat or beach and seldom surface more than 50 yards from their mark. Good divers also keep a careful check on tank pressure and turn around before the air is half gone. Their goal for every dive is to return to the boat or beach with at least 300 psi remaining in the tank.

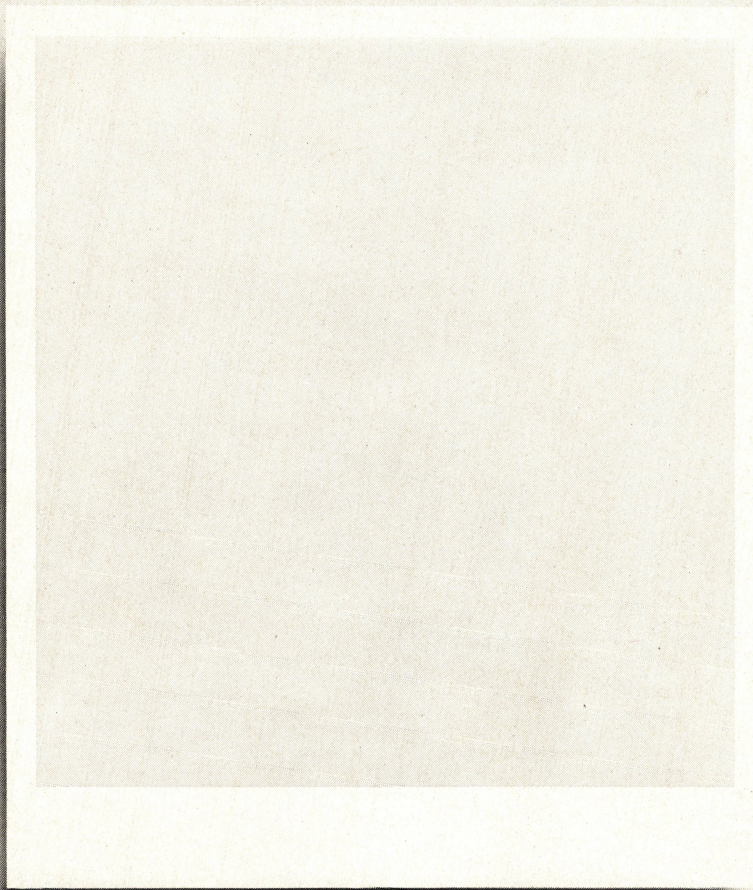
Buddy contact — "Never dive alone" is the cardinal rule of diving, but there is much more to the buddy system than being in the same ocean with another diver. Good divers maintain continuous contact with their buddies throughout the dive, either by visual or audio means. In some cases they have pre-arranged rendezvous points underwater, such as meeting a partner at the bottom of the anchor line before starting off across the ocean floor. Most important, good divers have a definite plan of action in the event that they should become separated from their partners.

Awareness — Good divers develop a "sixth sense" about impending trouble. They do this by maintaining a constant vigilance on those environmental factors which can contribute to a bad scene, for example: increasing surf, increasing current, signs of fatigue in a dive buddy, heavy surge, a bad surface chop, or the onslaught of nitrogen narcosis. Good divers, like good chess players, think ahead and when recognizing the signs of a problem, will generally avoid the situation by aborting the dive.

Pre-dive judgment — Knowing when not to dive is just as important as knowing how to dive. Good divers evaluate the dive site and water conditions long before making an entry. If the situation appears too hazardous because of storm surf, bad surge, or other weather conditions, they abort the dive. The same holds true for their personal condition. If they discover they have a bad cold, clogged sinuses, or just don't feel quite right, then they cancel out rather than burdening fellow divers with the possibility of a rescue problem.

Final definition — If you had to sum it up in one sentence, I think the definition might be: "A good diver is a careful diver." One who *avoids* trouble rather than one who is always struggling out of a tight squeeze. The next time you're out on a dive, take a look around you and see if you can pick out the good divers. Better yet, check yourself out on this test. ➤

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Diver's Calendar

June 13 New England Divers Second Annual Treasure Hunt. Food, drink, good diving, prizes and fun. (Contact: New England Divers, 131 Rantoul St., Beverly, MA 01915; (617) 922-6951)

June 20 Aqua-Nut Divers Annual Treasure Hunt and Membership Drive, Horseshoe Lakes Campground, St. Bernice, IN. Over \$2500 in prizes. (Contact: Aqua-Nut Divers, R.R. #1, Box 360, Clinton, IN 47842; (317) 832-9330)

June 26 Seventh Annual All Women Scuba Dive, Rockport, MA. (Contact: Rosemary Short, Aquawomen, P.O. Box 775 Central Square, Cambridge, MA 02139)

July 10-11 YMCA Scuba Lifesaving and Accident Management course with specialty certification for divers and SLAM instructor certification for YMCA instructors. (Contact: Ken McCracken, Land/Sea Passages, 14 E. Water St., Harrisonburg, VA 22801; (703) 433-2177)

July 10-11 California Beach Dive Photo Competition. Photos to be taken on July 10. Forty-five awards plus door prizes. (Contact: Alameda Divers, c/o Divers Exchange, 649 Pacific Ave., Alameda, CA 94501)

July 17-18 YMCA Assistant Instructor Institute. Instruction and testing on scuba skills, knowledge and teaching techniques. (Contact: Ken McCracken, Land/Sea Passages, 14 E. Water St., Harrisonburg, VA 22801)

July 17-24 Diving and the Meditative Experience. Sponsored by PRIDE, foundation for the Protection of Reefs and Islands, at Meridian Club, Turks and Caicos Islands. Exploring diving as a meditative state. (Contact: Drs. Randolph and Kent, 6690 SW. Ventura Dr., Portland, OR 97223; (506) 245-8004)

July 24-25, 31-Aug. 1, Aug. 7-8 YMCA Instructor Institute. SLAM and assistant instructor certifications are pre-requisites. (Contact: Ken McCracken, Land/Sea Passages, 14 E. Water St., Harrisonburg, VA 22801)

August 1 Long Island Diver's Association Second Annual Expedition Aquawoman aboard the *Wahoo* at Captree Boat Basin. (Contact: Edith Hoffman at (516) 643-9163)

August 14-15 Fourth Annual Pacific Coast Underwater Photographic Championships, San Diego, CA. Sponsored by the San Diego Council of Divers, Farallon/Oceanic, Aqua-Craft, Kodak, Scubapro, and Photoc of San Diego. (Contact: PCUPC, Al Bruton, 4517 Maryland St., San Diego, CA 92116)

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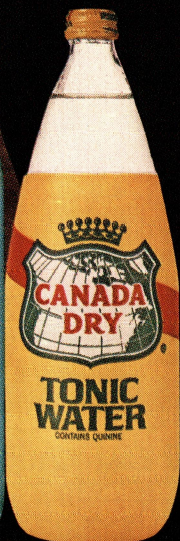
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Technifacts

BY E.R. CROSS



A perfectly accurate depth gauge, read correctly, does not necessarily make a safe dive. A dive demanding decompression can be a safe dive only if the diver knows how to read and to follow decompression table schedules. And, divers must keep in mind, *all dives demand decompression*. In some dives decompression is nothing more than the proper rate of ascent to the surface. But the safety in the tables, whether using them as no decompression tables or to program a decompression schedule, is predicated on the diver following the proper rate of ascent (decompression). An accurate depth gauge and an underwater watch make following prescribed rate of ascent more accurate and the dive safer.

Decompression tables in use by almost all American sport divers are the U.S. Navy repetitive dive tables. These are not necessarily the shortest tables, nor the longest, nor even the best. They are simply a happy medium of decompression time vs. bottom depth and work time developed for the average Navy diver who is, usually, in better physical condition, younger, and better trained than his sport diver counterpart. But, even Navy divers get bent when using these tables. Sport divers should be even more cautious.

Technifacts has no objection to the Navy's repetitive dive tables. They are probably the most suitable for sport diving and a great deal of the commercial diving done today. There is, however, a desperate need for standardization of the repetitive dive tables; in presentation, in nomenclature of the various parts of the tables, and, most critical of all, standardization in teaching. I have listened to instructors explaining the use of decompression tables and, if they had followed their own instructions, they would have been bent seriously.

Technifacts would like to hear from divers throughout the world on their

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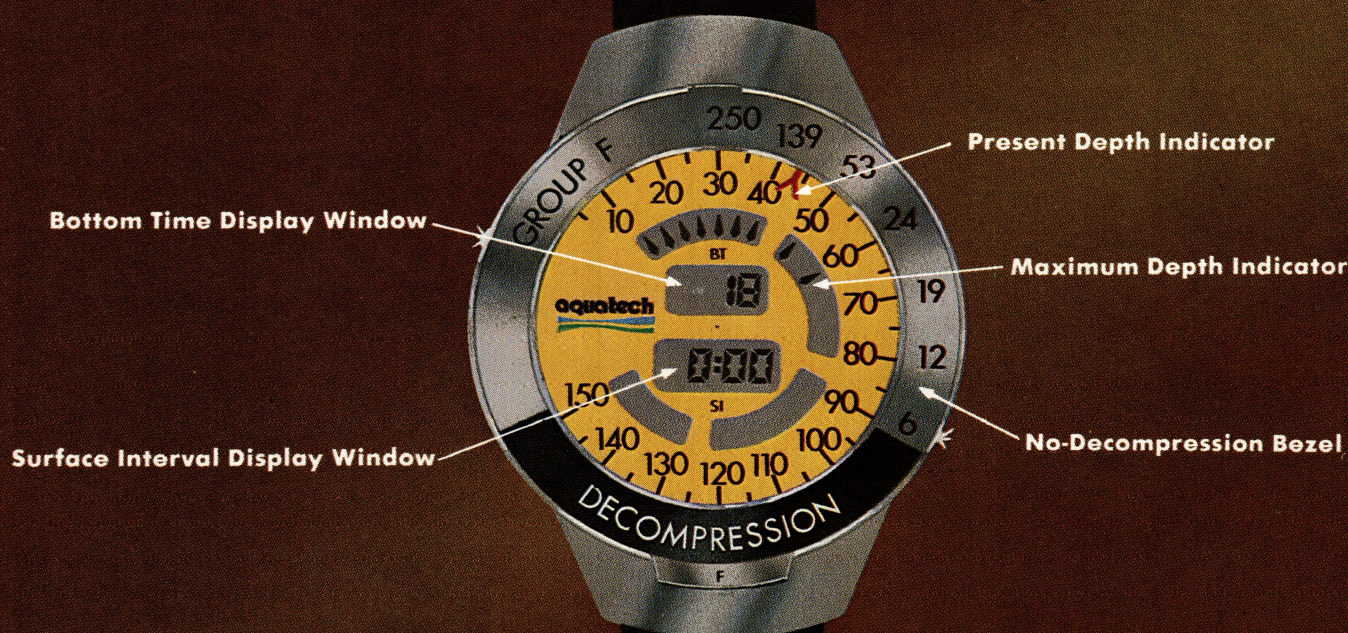
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TECHNIFACTS

thoughts on decompression tables, their use, how they were taught, and what their dive requirements indicate decompression tables should provide for them. Write to Technifacts, c/o SKIN DIVER, 8490 Sunset Blvd., Los Angeles, CA 90069 USA.

IN COMMERCIAL DIVING HOW DEEP IS DEEP?

Ocean Industry reported that there was a steady growth for the diving service industries (underwater inspection, maintenance and repair) in 1981 and that there was a growing emphasis on project management teams to handle all aspects of a repair operation. The magazine also reports that working dives to 2000 feet of sea water (fsw) are routine. Other industry publications feel routine dives are those to depths of 650 to 700 feet but that commercial dives can be made safely to depths of 1700 to 2000 feet.

Many of the problems confronting sport divers are those which the commercial diving industry must also overcome: Hypothermia; work in strong currents; lack of visibility; poorly designed tools and equipment; and, just as critical as in sport diving safety, poor training and lack of qualification of personnel for specific jobs. Rising costs are also a problem in commercial diving. It probably costs a sport diver about \$1,500 to equip himself for the open sea. To put a saturation dive team on the bottom, keep it alive, and bring it back to the surface from a depth of 300 feet or more requires an outlay of over one million in equipment and perhaps \$25,000 per day operating expense (the actual amount depending on depth and number of people required to accomplish the mission).

DIVEBOAT FENDERS

Commercial dive boats sometimes have problems finding fenders made of heavy enough material. An inexpensive solution for extremely heavy duty fenders is to use old, discarded oil cargo hoses.

Hoses come in many sizes and weights. For small, wooden hulled boats a good fender can be made from hoses in the four inch diameter range. For larger (45 to 80 foot) steel hulled boats, hoses 12 and 16 inches in diameter offer excellent protection from other ships, barges or piers.

To use the hoses it is necessary to take a couple of precautions and to slightly modify them. Most have been used for pumping hydrocarbon products such as crude oil, bunker stock, or lighter material such as diesel, jet fuel or gasoline. Whatever the product, residues will

(Continued on Page 14)

use an Instructional Course with Balance

Learning to dive should be fun; however, certain knowledge areas can be dull if presented in the wrong way. Designing an instructional course that shows the fun of diving, yet, covers those important knowledge areas is a challenge.

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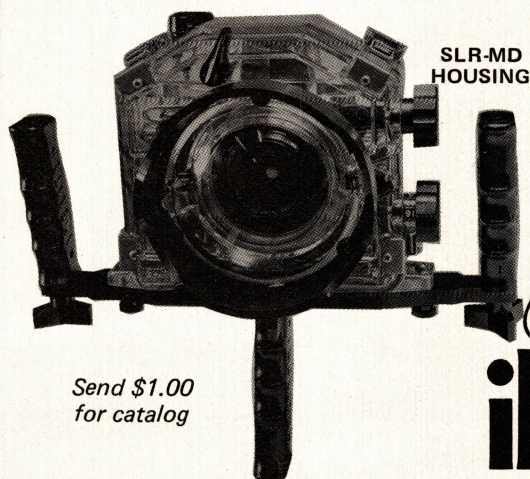
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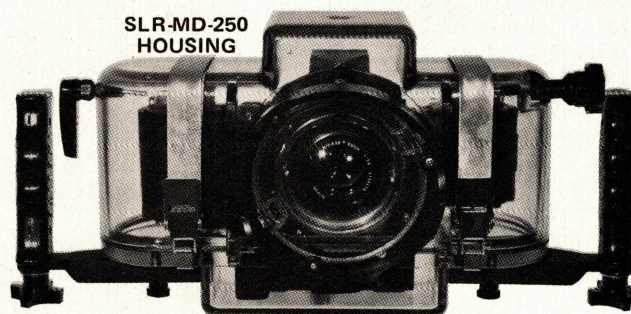
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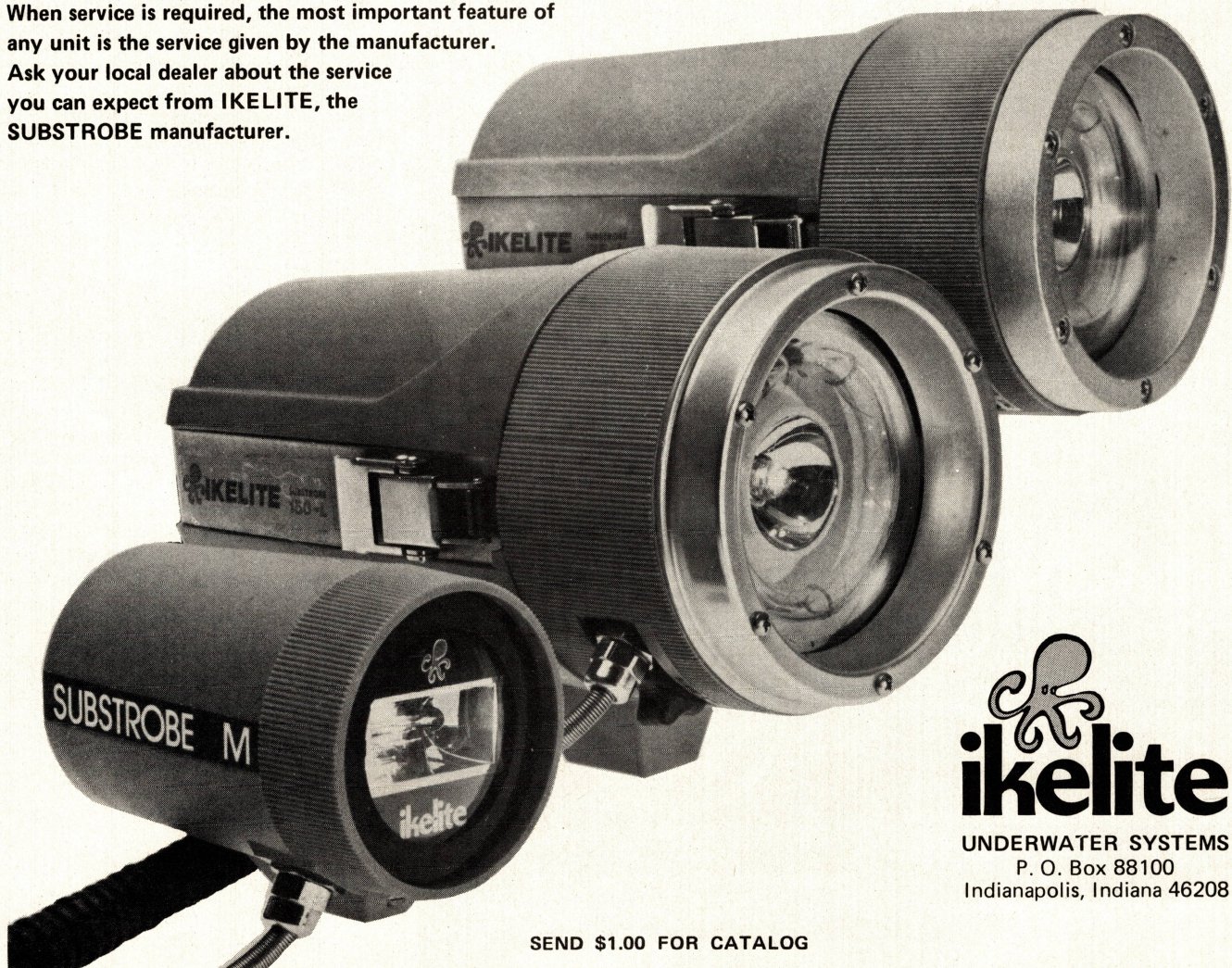
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TECHNIFACTS

(Continued from Page 11)

remain in the hose and it will be necessary to steam clean it before use.

Modify a hose by first cutting off the steel flanges and the pipe nipple. Most hoses have wire windings inside for strength and sometimes for rigidity. The rubber part can be cut with a hack saw (in the smaller sizes) or with a heavier duty saw. It may be necessary to cut the reinforcing wire with a cutting torch.

When the hoses have been cut to the appropriate length, cut holes in them through which chains can be rove so they can be suspended over the side of the boat. Fenders made and used in this fashion are almost indestructible.

Old hoses are usually available from refineries, ship loading piers, cargo handling companies and other companies that pump bulk liquid cargoes.

TECHNI-BRIEFS

Efcom Communication Systems, Irvine, California has a wireless underwater communication system, reportedly with more than 90 percent intelligibility. Primarily designed for the commercial diver using a full facemask, it can also be used with the AGA or other full facemask with scuba.

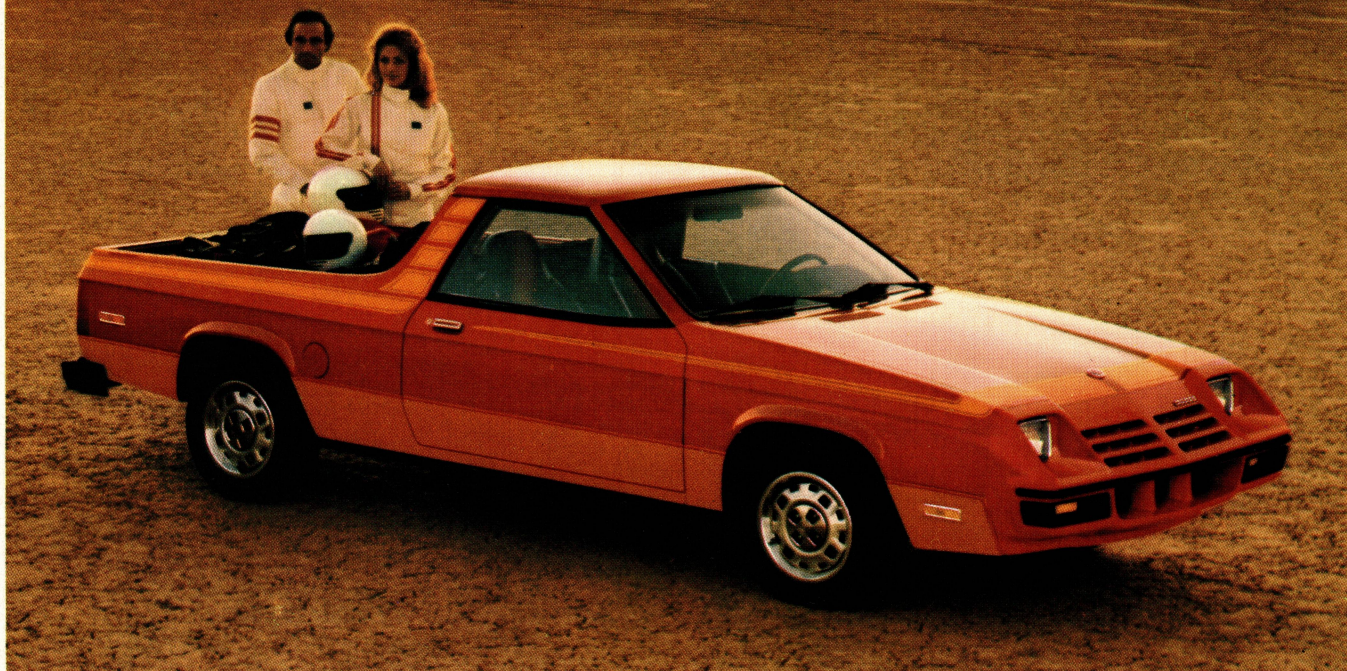
West Australian Petroleum Party, Ltd., Perth, Australia has contracted with Solus Ocean Systems, Houston, Texas to provide a one atmosphere observation bell aboard the drill rig *Ocean Prospector*. Also, Solus will provide two years diving services aboard the drill ship, *Danwood Joe*, off southern Australia.

In a six month period \$45 million in remote (unmanned) vehicles were sold in the North Sea area alone. The European industry is taking the lead with 57 units in operation compared to 28 in the U.S. industry. European industries are also ahead in manned vehicles with 43 vs. only 20 by the American marine industry. These units seem to be more popular with offshore oil development than in operation, inspection and maintenance work where the thinking and tactile capabilities of human divers are still in demand.

Divers wanting more complete information on items mentioned briefly in Techni-Briefs may write to Technifacts, c/o SKIN DIVER, 8490 Sunset Blvd., Los Angeles, CA 90069 USA.



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Rx FOR DIVERS

BY FRED BOVE, M.D., Ph.D.

With the large numbers of coronary bypass operations being done every year, we all know someone who has had this operation. Divers are not exempt from problems with arteries to the heart. Richard Stabe of Naples, New York and Leon Singer of Fairlawn, New Jersey, asked about diving following recovery from this surgery. As usual, the answer is not a simple yes or no but depends on a variety of individual differences. Let's try to get some insight into the problem, then decide on an answer. To start, let's discuss the disease that leads to the surgery.

The heart is nothing more than a muscle which was specially designed to pump blood through the body. The model hasn't been changed for thousands and perhaps millions of years, but all in all it works well — often for 80-90 years. Sometimes it needs repairs, but very, very rarely ever gets replaced. Now and then a valve gets replaced and more frequently, an artery gets bypassed or reopened.

The disease which causes a clogged artery is atherosclerosis. It results in narrowed segments of the arteries which supply nutrients and oxygen to the heart muscle. If one of these arteries is blocked even for a few minutes, the muscle stops working properly; and if the blockage lasts for 30 or 40 minutes, there is permanent damage to the muscle and part of its function is lost.

We can consider the problem of blocked arteries and bypass surgery together, and we should add another procedure called angioplasty where the blocked artery is opened from the inside by inflating a tiny sausage-shaped balloon passed into the artery.

Commonly, partial blockage of an artery to the heart will not cause any problem until you try to exercise and the heart has to work harder. When a partial blockage is present, oxygen carried by

(Continued on Page 20)

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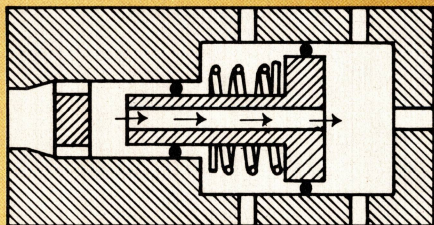


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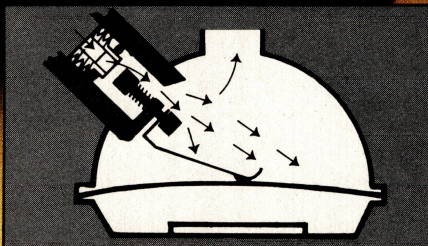
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A Crystal Shotgun

Scubapro's
Son of the Gun
Crystal Snorkel

By Jim Walker

The Son of the Gun Crystal snorkel combines the best of its predecessors with some new features of its own. The central feature around which all three of Scubapro's Shotgun snorkels are designed is the self-draining valve. It is basically a one-way purge valve placed low on the barrel. When the diver surfaces after a dive and raises the snorkel shaft out of the water, gravity forces any water in the barrel to drain out through the purge. The diver can then clear the water remaining in the lower curve of the snorkel by exhalation. Because most of the water has already drained out of the tube, less exhalation effort is needed to clear it. This effort saving mechanism can make a big difference to a snorkeler making repeated dives, to a diver making a long surface swim with waves splashing water down his/her snorkel, or to a novice snorkeler.

The Son of the Gun Crystal has a smaller diameter (bore) barrel than the Shot-

gun. This makes it suitable for smaller divers with smaller lung capacities: They don't need huge quantities of air.

The smaller mouthpiece of the Son of the Gun Crystal also increases comfort for smaller divers. It is patterned after the contour mouthpiece used on the second stage of Scubapro regulators.

What sets the Son of the Gun Crystal apart from the other Scubapro Shotgun snorkels are the materials used in its construction. The lower half of the Crystal, including the mouthpiece, is made of hypoallergenic, medical grade, silicone rubber. This material is a blessing to the many divers who have suffered allergic reactions to the rubber used in conventional snorkels. The new compound is soft, pliable and translucent. It is also virtually indestructible. The material is resistant to ozone and, it won't spontaneously break down over time as neoprene rubber can.

The barrel of the Crystal snorkel is made of clear, CAB plastic. This material is virtually unbreakable. The tip of the barrel has the familiar bright red and white wrap-around for high visibility.

Underwater photographers have found that masks made of a colorless, translucent material enhance photos of divers. The material allows light to enter the mask and illuminate the model's face. The Crystal snorkel will complement such masks and further enhance photos.

The Son of the Gun Crystal snorkel retails for \$32. It's available at your Scubapro dealer.

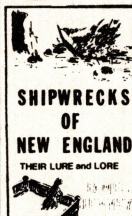
The Son of the Gun Crystal and Jet Crystal snorkels

(left) have scaled-down mouthpieces and smaller bore diameters to suit smaller divers. The lower half of each snorkel is made of hypoallergenic silicone rubber. The Son of the Gun has a self-draining purge valve on the barrel.

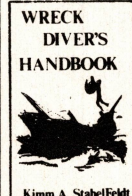


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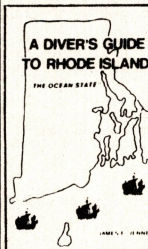
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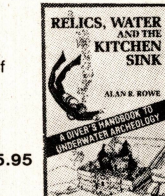
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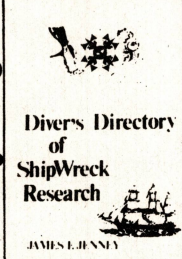


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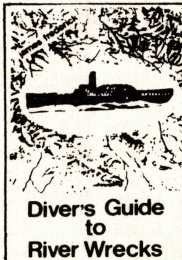


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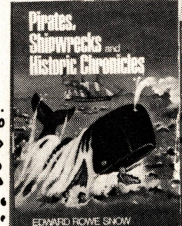
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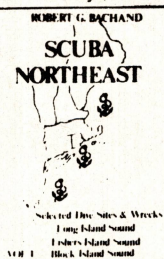
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RX FOR DIVERS (Continued from Page 16)

the blood cannot be delivered to the heart muscle in adequate quantities. This reduced delivery of oxygen causes several problems. First, it can produce chest pain which is an important warning sign that the heart is starving for oxygen. Second, it can produce abnormal or irregular heart beats, which sometimes can lead to the heart stopping. When the heart stops, survival depends on the quick action of other people who can provide CPR.

Since the most important problem in diving with coronary artery disease is exercise that causes the heart muscle to be starved for oxygen, we can test a prospective diver during exercise to see if he or she can withstand the necessary physical exertion. We like to produce excess stress to be certain the patient can handle an occasional extreme load. Whether you have coronary artery disease treated with medicine or surgical bypass or if you have had the angioplasty procedure, the question which must be answered is whether your heart gets enough blood flow when you exercise.

Sometimes there are too many blocked arteries to bypass all of them. Many times all the blockages are bypassed or opened with angioplasty, and there are no measurable limitations on your heart. The answer can be determined by careful analysis of the number of blocked arteries seen on X-rays, the number which were repaired, and your measured response to exercise. Putting all of this information together, an answer can be provided concerning a return to diving.

Following coronary bypass surgery, even with all the arteries repaired, an exercise program should be followed to improve your exercise tolerance. Restoring good physical condition is a must for diving following any illness.

One other aspect of coronary bypass surgery should also be mentioned. Scar tissue resulting from any surgery is probably more prone to bends than normal tissue. If you are cleared for diving after the tests are done, it is important that you follow proper decompression procedures. Always dive within the no decompression limits and shorten the no decompression dive times by five minutes at all depths.

We would recommend going back to diving or beginning a scuba course after coronary bypass surgery only if your exercise capacity is completely normal, there is no evidence of inadequate blood flow to the heart during exercise, there are no serious problems with abnormal heart rhythm, and you are

(Continued on Page 117)

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U/W CAMERA RENTALS

Marine Grafics is now renting underwater motion picture cameras for professional use. This new venture is in addition to the company's own film production and underwater cinematography services.

Marine Grafics recently purchased one of the world's most sophisticated underwater 16 mm cameras. The Teledyne DBM 9-1 integral camera with a 6.6 mm wet front element lens, incorporates electronics and optical engineering.

The 28 pound camera is perfectly balanced for underwater use and can be easily operated with one hand. The camera features a 400 foot quick change magazine with variable film speeds. The 6.6 mm wide-angle lens allows photography in very poor visibility.

In addition to the DBM 9-1, Marine Grafics rents 100 foot load cameras, lights and underwater grip equipment for professional use.

For information on camera crews, surface support and underwater camera rentals, write or call Bill Lovin at Marine Grafics, Box 2242, Chapel Hill, NC 27514; telephone (919) 933-6338.

PRINCETON MOVES

Princeton Tectonics, manufacturer of diving instruments, has moved to new and larger quarters in Bordentown, N.J. The new facility has over 12,000 square feet of space and will enable Princeton Tectonics to proceed with their product expansion program as well as providing more room for research and development, quality control, testing and customer service.

Princeton Tectonics is now located at: 261 Route 130, Bordentown, NJ 08505; telephone (609) 298-9331.

TANK CORROSION REPORT

A report entitled Corrosion of Steel and Aluminum Scuba Tanks (publication number P 769) is available from the University of Rhode Island Marine Advisory Service. The report contains a detailed summary of scuba tank corrosion studies conducted between 1970 and 1977 by the URI Scuba Safety Group. These tests examined the corrosion potential of steel tanks versus aluminum alloy (6351-T6) tanks. Results of these controlled 100 day tests clearly showed that aluminum alloy tanks resist corrosion far better than steel. The researchers also recommend that manufacturers of aluminum tanks replace the brass valve extender with a plastic version.

The cost of the report is \$3.00 and requests should be sent to URI, Marine Advisory Service, Publications Unit, Narragansett Bay Campus, Narragansett, RI 02882.

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Most people are so used to communicating with either the written or spoken word that they rarely develop a proficiency in other forms of expression. Thus, when divers want to communicate underwater, the results are less than satisfactory. An experience I had a few years ago while diving with a brand new buddy illustrates this very well. On that day the waters around California's San Clemente Island were clear, with visibility about 40 feet. My buddy, polespear in hand, swam slowly ahead. I followed some ten feet behind, trying to observe his technique while staying out of the way and not spooking the quarry.

We had reached the middle of a small clearing in the kelp when he stopped, made eye contact with me and pointed off to the right. I looked in that direction but saw nothing. Shrugging my shoulders, I tried to look puzzled behind my

mask and regulator. Once again, he pointed off to the right. The message was clear to me: Swim over there. Off I went, fins churning. I had swum about 15 feet when something grabbed my leg, bringing me to an abrupt halt. It was my buddy, with another signal. This time his meaning was unmistakable. The violent shaking of his head from side to side meant NO! Holding me firmly, he pointed off in the distance again. Hanging there in mid-water watching us were three electric rays, now a scant 15 feet away. My buddy had been trying to warn me that the rays were there so that I *wouldn't* swim toward them. These creatures sometimes follow divers, especially those who are spearing fish or bagging other game. Years later I accidentally bumped into one that was swimming above me. That encounter resulted in a nasty shock and my arm still tingles when

I think about it.

Misunderstandings can be avoided underwater if you and your buddy know a few fundamental hand signals. On this and the next page we have printed 30. The first 10 are internationally recognized in 50 countries. The rest are basic and commonly used. Printed here courtesy of PADI, they are easy to learn and could save you time, energy and possibly, trouble. We suggest you cut out these pages, laminate them and carry them in your gear bag. A four page black and white brochure containing all of these signals is available for \$1.50. Write PADI, 1243 E. Warner Avenue, Santa Ana, CA 92705 and ask for Consumer Information Bulletin No. 102.

After you've studied and practiced these signals, turn to Dennis Graver's Scuba Quiz for additional information on them. ➤

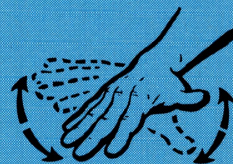
PADI HAND SIGNALS

avoid misunderstandings
communicate underwater
by basic symbolic logic

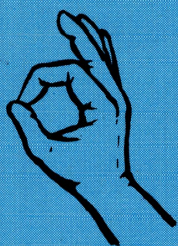
by Bonnie J. Cardone



Stop, hold it, stay there



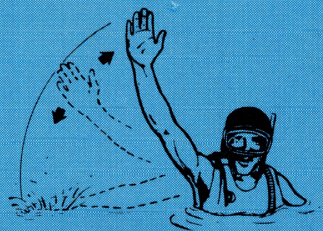
Something is wrong



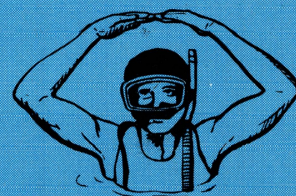
OK? OK



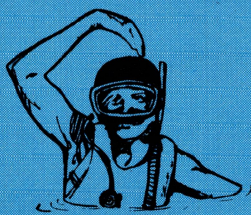
OK? OK (glove on)



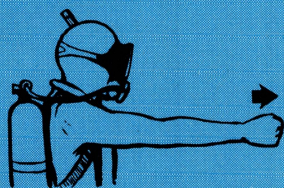
Distress, help



OK? OK (on surface at distance)



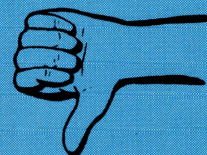
OK? OK (one hand occupied)



Danger



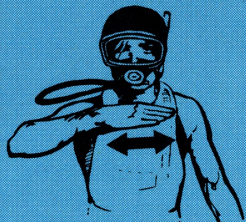
Go up, going up



Go down, going down



Low on air



Out of air



Buddy breathe or share air



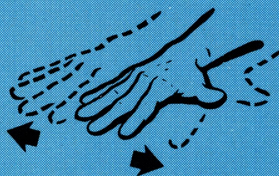
Come here



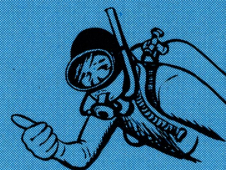
Me, or watch me



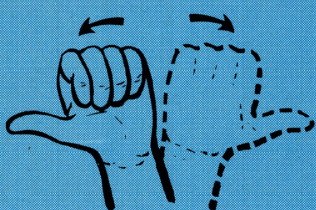
Under, over, around



Level off, this depth



Go that way



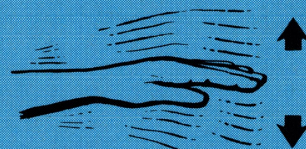
Which direction?



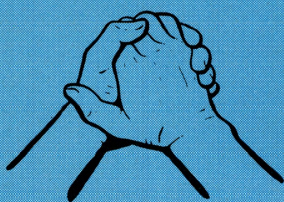
Ears not clearing



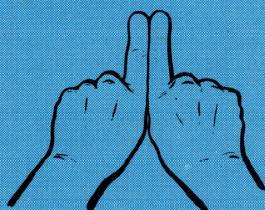
I am cold



Take it easy, slow down



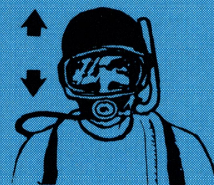
Hold hands



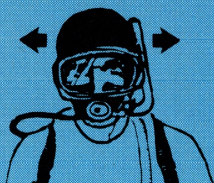
Get with your buddy



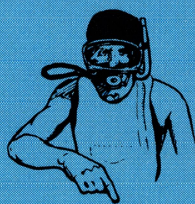
You lead, I'll follow



Yes



No



Look



What time? What depth?



I don't understand

Why buy a copy when you can buy the original.

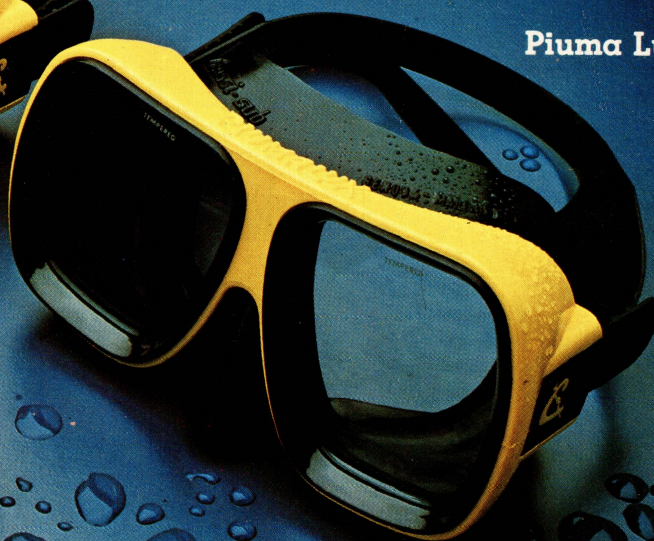
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DEMA SHOW

The sixth annual DEMA trade show and convention, held on January 23-26 in San Antonio, Texas was the biggest show ever. Dive retailers visited over 370 booths spread over 90,000 square feet in the San Antonio Convention Center. Attendees came from all over the world — from Japan, Australia, Germany, Italy, Switzerland, Mexico and from all over the United States. Dignitaries included Jean-Michel Cousteau.

Exhibitors included major manufacturers of wetsuits, spearguns, instruments and gauges, gifts, jewelry, buoyancy devices, underwater lights, photography equipment, underwater vehicles and communication systems, metal detectors, air compressors, inflatable boats, bags and carrying devices, and clothing.

There were seminars on small business law by attorney, Joel M. Ward, and by Jack Quinton on retail advertising. SKIN DIVER Magazine publisher, Paul Tzimoulis, gave talks on selling dive travel, and throughout the show there were slide presentations by underwater photographers on various dive spots.

The DEMA film festival attracted an audience of over 1,500 people. Frank Scalli of U.S. Divers was MC, and featured on the program was a premiere of Jack McKenney's new film, *The Emerald Sea*, shot in British Columbia and featuring giant octopuses, wall diving, shipwrecks and mammoth sea lions. Peter Gimbel and Elga Andersen presented clips from their upcoming network documentary about the salvage of the sunken Italian liner, *Andrea Doria* during 1981.

At the dinner Monday night, the DEMA Stanfield Scholarship was awarded to Jonathan Trent, a graduate student of Scripps Institution of Oceanography. Trent is studying the role of marine snow particles in conveying food and energy to organisms inhabiting the deep sea.

The 1983 DEMA show will be held in Las Vegas, January 20-23. In order to level traffic flow and to better serve attendees, the show will begin on Thursday instead of Saturday.

For further information, contact DEMA, P.O. Box 217, Tustin, CA 92680.

VALENZUELA/ AQUA-LUNG

Mario Valenzuela has been promoted to division marketing manager of Aqua-Lung (division of U.S. Divers Co.). In the new position, Valenzuela will be responsible for the marketing activities including new product development and advertising. Valenzuela has over 14 years in the diving business and has traveled the world promoting sales and developing new products.

For YOUR deep-sea diving training...

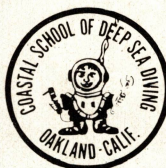
Choose the School that has earned the highest marks from its students!

At The Coastal School of Deep Sea Diving, we ask all students in every class to tell us why they chose our school. The "Report Card" below summarizes a few of the reasons most often given:

REPORT CARD		
"A-plus" reasons why students choose Coastal		
SUBJECT	DESCRIPTION	GRADE
LOWEST COST	\$1295 for 11 1/2 weeks. The lowest in the industry, and most for your dollar.	A +
HIGHEST SAFETY	No fatalities or major accidents in school's history.	A +
MOST EXPERIENCE	Now in 33rd year. More than 6,500 graduates.	A +
BEST EQUIPMENT	Training in more kinds of helmets and other equipment.	A +
IDEAL LOCATION	San Francisco Bay Area. No snow. All-year schedule.	A +

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Enclosed is \$2.00. Please send my book.



SD-62

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GRAND PRIZE

A deluxe one week (8 days, 7 nights) dive vacation package for two in Haiti (includes room, meals, and diving) at the Kaliko Beach Club (courtesy of Baskin in the Sun, A PADI Training Facility and DVI Resort Destination).

Second Prize

A \$250 Gift Certificate to be used at the PADI Training Facility issuing the registration coupon.

5 Third Prizes

5 Heavy-duty "PADI Diver" Jackets

15 Fourth Prizes

15 PADI Sport Shirts

50 Fifth Prizes

50 "PADI Diver" Patches

200 Sixth Prizes

200 PADI Emblems

HERE'S HOW TO ENTER

First, simply contact the nearest PADI Training Facility (write to PADI Headquarters for a list of participating stores). Take a non-diver friend into the facility and introduce him or her to the courteous staff. You will each receive a free gift — PADI's exciting "Turn On To Scuba" bumper decal — and a sweepstakes registration coupon. Just fill out the coupon and return it to the issuing facility, and you will become eligible for hundreds of prizes! Each time you take a new non-diver into the participating facility, you get another coupon, and another opportunity to win. Hurry — Sweepstakes ends June 15, 1982. Don't miss your chance — win big in PADI's "Turn A Friend On To Diving" Sweepstakes!

The official drawing will be held July 15, 1982. Only fully completed coupons will be honored. This promotion may not be available in some areas. Void where prohibited by law.

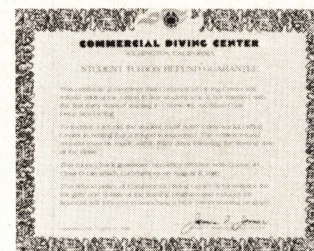
For a list of participating stores, contact:

PADI TRAINING FACILITY DEPT.
1243 East Warner Avenue • Santa Ana, CA 92705
(714) 540-PADI (7234)

PADI

CDC TUITION GUARANTEE

In an unprecedented move to protect the inherent financial risk for students starting a new career, Commercial Diving Center in Wilmington, California has developed a tuition refund guarantee plan for enrollees of the 17 week air/mixed gas commercial diver course #1. The Los Angeles Harbor-based school issues tuition refund guarantee certificates to all inquirers along with the



CDC catalog. Any time within the first 30 days of attendance in the course, a student who decides the career is not right for him/her can obtain a full refund of all tuition paid to date.

"We recognize that commercial diving as a profession is not for everyone," stated Jim Joiner, CDC's executive director, "and that only the dedicated, hardworking individual is successful in this business. The initial investment to which commercial diver trainees must obligate themselves is considerable. Therefore, we feel our own obligation to protect the student who discovers in the first weeks of training that diving just isn't for him, after all."

IRELAND SCUBA TOURS

American scuba enthusiasts will be able to combine five days of scuba diving with a driving tour of Ireland this summer. The ten day tour package offers a choice of guided touring or the chance to independently wander the picturesque fishing villages, castles and other antiquities, with rendezvous at three scuba resorts.

Ireland's west coast has long been a popular spot with European divers because of underwater visibility that ranges up to 100 feet and the opportunity to dive with, and photograph, seals and porpoises.

The tour price of \$599 includes all accommodations, most meals, a shared automobile, all dive boats, tanks, air, dive guides, an orientation on the local marine life and a NAUI specialty diving certification.

Departures are planned for August 10 and 17. Other dates can be arranged for groups. For reservations or more information contact: Gael-Tech, 436 East 58th Street, New York, NY 10022; phone (212) 237-2876.

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DIVE MUSEUM

On March 6 the Institute of Diving brought a piece of history to Panama City, FL when it opened the doors of the International Diving Museum. Approximately 1800 interested visitors viewed numerous historic and state-of-art exhibits.

The Institute, which has 800 members, is a non-profit, educational organization formed in 1977 under the leadership of Dr. George Bond for the advancement of professional, literary and scientific knowledge related to man's underwater activity. Membership consists of sports, commercial and military divers, as well as other interested individuals and organizations.

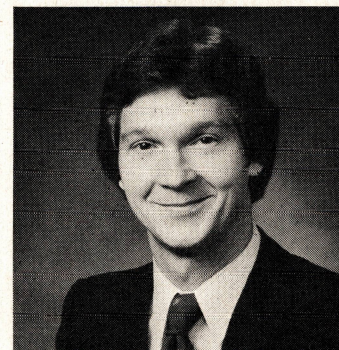
The museum, which is the only facility of its kind, is located on prime waterfront property on the downtown Panama City Marina overlooking St. Andrew Bay. Major outdoor exhibits include SeaLab I, Mark I Deep Dive System and a Trieste Sphere.

In early 1981 the Dreyfus Foundation of Washington, D.C. furnished a generous grant which enabled the Institute to take advantage of opportunities and open the museum at this excellent location. Also, assistance and encouragement were given by Mr. George Vadnais, curator of the Navy; George Firestone, Florida Secretary of State; several commercial diving companies; numerous businessmen; and Panama City.

Additional information may be obtained by contacting the Institute of Diving, P.O. Box 876, Panama City, FL 32401; phone (904) 769-7544.

THORNHILL/BLEWATER

Michael S. Thornhill, independent sales representative with Princeton Telectonics and JBL Spearguns, has been ap-



pointed the western states sales representative for BlueWater Wetsuits. Mike's territory is California, Washington, Oregon, Arizona, Nevada and Utah.

Why Houston?

BECAUSE

The Ocean Corporation is located in Houston and more commercial divers are hired in Houston than in any other place in the world. Twelve diving companies are located in Houston including three of the four largest in the U.S. Many others are located in the nearby New Orleans area. The demand for divers is so great in Houston that large locally based diving companies like Ocean Systems, Hydrotech Systems, Martech International and Sea Tech International have hired many of our students for part-time work while they were attending school. Over 90% of our recent graduates went to work for these and other local diving companies when they completed our program. Houston is the place where the action is...the commercial diving, offshore construction and oil industry capital of the world.



BECAUSE

The Ocean Corporation is a commercial diving company, not just a school. Our facilities, equipment and training aids are the best, and our diving systems are as up-to-date as possible... because much of the equipment is used by our diving operations division to perform actual diving contracts in the field. Ocean Corporation has successfully completed many underwater jobs for various industrial clients over the years... including specialized underwater inspections, maintenance and repair work. For example, we did the world's first commercial underwater repair job in a nuclear power plant. And most of our divers have been graduates of our own school.

BECAUSE

The Ocean Corporation is a convenient and exciting place to go to school. Houston is one of the fastest-growing and most dynamic cities anywhere. It is a city of expansion, energy and youth (the average resident's age is in the mid-20's). Houston offers every conceivable kind of entertainment, from sports events, ultra-modern discos and open-air theater to rough-house local rodeos, chili cook-offs and the new Texas-size

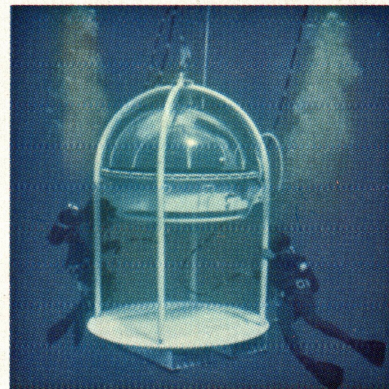


country-western dance clubs. Reasonably priced adult and singles apartments are readily available within walking distance of the school, and fast-food to luxury restaurants are nearby. The semi-tropical climate is wonderful, the sport diving is great and the folks are friendly.

BECAUSE

The Ocean Corporation management and instructor staff have long-term experience in the international offshore oilfield diving business. Retired ex-military divers and sport scuba divers don't run the school...commercial divers do. For example, the President of The Ocean Corporation, Larry

Cushman, was Vice President and Europe/Africa Area Manager for Ocean Systems, Inc. for three years...with responsibility for all North Sea diving and underwater construction operations. He also worked six years as a manager for Oceaneering International, Inc., another of the world's largest commercial diving contractors. Ocean Corporation managers and instructors know today's diving business...first-hand, from recent experience.



The Ocean Corporation

5709 Glenmont • Houston, Texas 77081

If you are interested in becoming a commercial diver, please write and ask for our free information package on job opportunities, our school and our super city. If you'd rather call, make it collect and ask for Fred Tourtel (713) 661-0033.

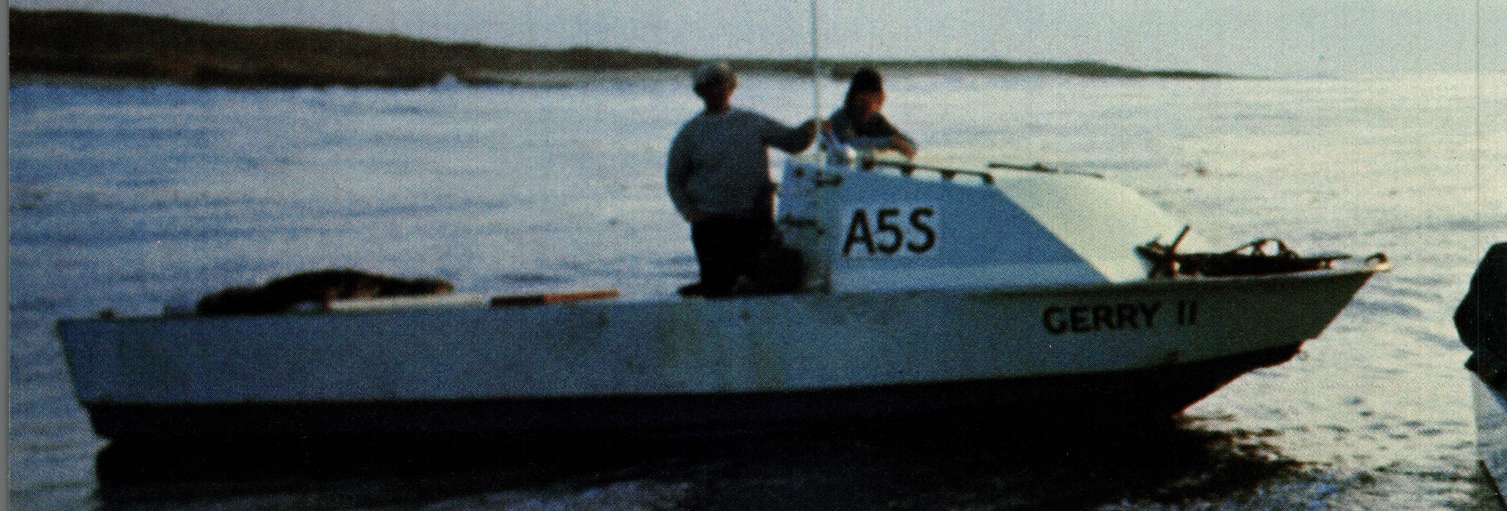


School of
Commercial and
Industrial Diving

NAME _____ AGE _____
STREET _____
CITY _____ STATE _____ ZIP _____
A/C _____ PHONE _____

THE CALIFORNIA ABALONE DIVERS

A Dedicated Breed
In Love With The Sea
By Hillary Hauser

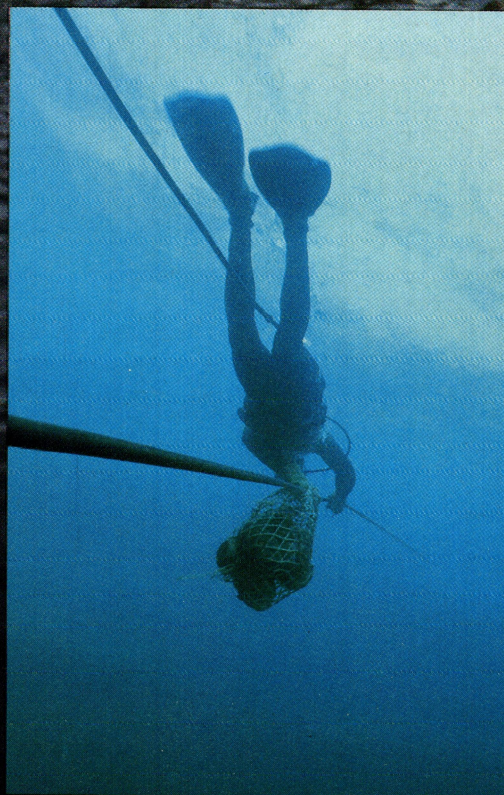


In the frozen stillness of pre-dawn hours, when most people are still asleep, a single boat pulls out of the Santa Barbara harbor and heads out to sea in the direction of the Channel Islands. Two men, wearing heavy coats and hats, stand at the helm of the boat and they will stand for the entire trip across the channel because in a commercial abalone boat no one sits down during rough rides.

One and a half hours later, just as the run rises, one man quickly dresses in a heavy wetsuit to make his first dive. The other moves around the deck, tending to the anchor, pulling out a long hookah hose from the hold, preparing equipment for the diver dressing in.

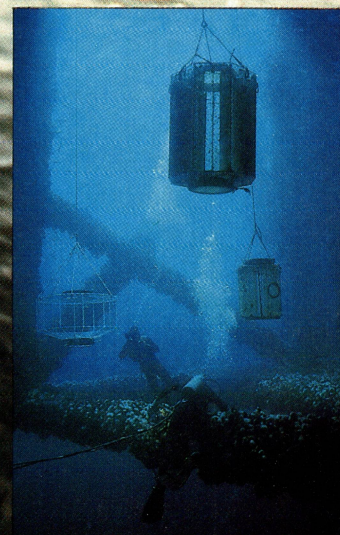
The diver is over the side after getting into his suit, wasting no time on talk. His air bubbles mark the trail he swims and in a short time he is back on the boat. The tender rapidly coils the air hose, pulls anchor, moves the boat, re-anchors, and the diver again rolls over the side. Within an hour the two will have moved to as many as three or four spots, and there will be at least two or three dozen abalone on deck if all has gone well. It will be like that the remaining hours of the day.

The physical requirements to work a large number of hours in the water make commercial abalone divers among the most efficient underwater people in the world. They know where each reef is, where certain shipwrecks are, where there is an ancient Indian midden or a strange phenomenon of sea life

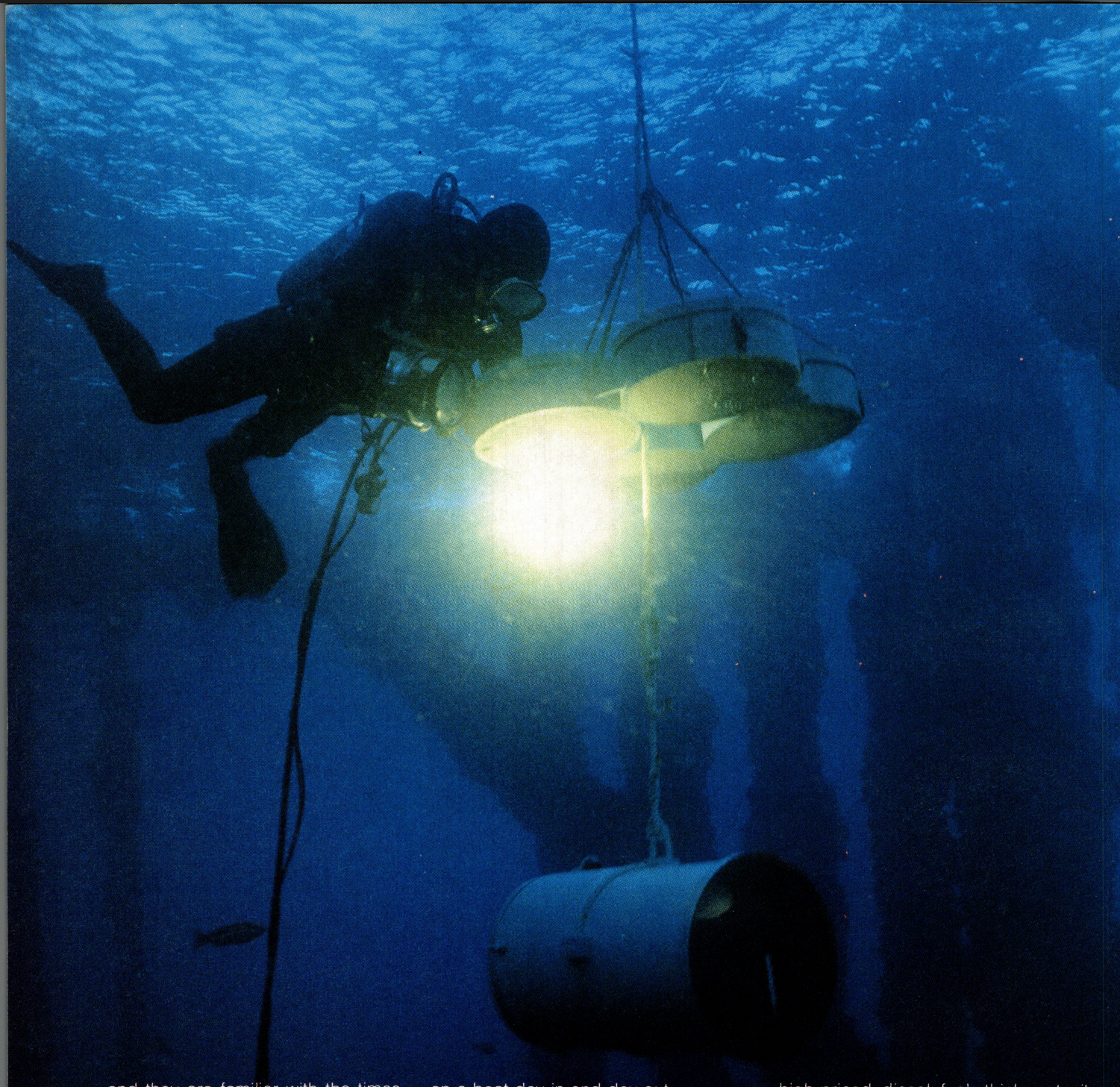




Above: Under a hazy morning sky, commercial abalone divers move their boats to a new site.
Left: Following his air hose back to the boat, a commercial ab diver surfaces with his catch.
Below: Tenderizing abalone slices by pounding. Shelled abalone await trimming and slicing.
Right: Nurseries for rearing baby abalone hang in mid-water beneath a commercial oil platform.



photos/ Bob Evans



— and they are familiar with the times, tides and seasons of the sea. They know the offshore islands like the back of their hand and each reef is like a street in their home town. Commercial divers generally stick together, helping each other when trouble hits.

Many people think about the physical demands made on commercial divers and wonder if they're not a little crazy. It's not just a matter of having arms as big as basketballs and legs as big as tree trunks, nor is it necessarily a matter of wanting the abalone. A common denominator among successful abalone divers is a love of the sea, complete with the cold, the storms, rough water, sun, calm, seagulls, rain and the loneliness — all that is associated with being

on a boat day in and day out.

The wonderers also ask how anyone can base their business on so much chance.

"It's one of the last ways that man can make a living in a frontier way," says one diver. "You know — where he can go out, forage for food, feed his family, bring back meat to the table."

Says another, "To make your living off the sea — that's what it's all about."

It's a business beset with variables: while the average executive can sit in an office building during stormy days and still make a living, the abalone diver may have to stay away from work when seas are wicked. The abalone diver also has to invest heavily in himself — in expensive boats, compressors and air hoses,

high-priced diesel fuel, thick wetsuits, and hard-to-get commercial licenses. And, there is a tender to pay — someone to help him while he dives. The harvest of abalone itself isn't guaranteed either, because abalone beds change from year to year, and they are becoming scarcer off California.

The commercial divers themselves admit that the chief reason for the decline of the abalone is the large numbers of the shellfish that have been taken over the years by their own people. The California Fish and Game department has restricted the number of commercial licenses they grant, but no one knows how much damage has been done and exactly what measures it will now take to turn the situation around.

photo/Bob Evans

Some of the ab divers are trying to replant abalone beds that have provided previous harvests.

Win Swint and Lad Handelman are two commercial divers working out of the Santa Barbara harbor who have achieved reasonable success in the profession. Handelman was an abalone fisherman 20 years ago, before he started Oceaneering International, and he returned to the local abalone diving arena when he left Oceaneering in 1979 to form another offshore diving company. Swint has been diving abalone for almost as long as Handelman stayed away from it and for the past ten years he has been experimenting with the growing of spat (larval abalone) in fish tanks in his living room and in offshore habitats.

Under the auspices of the Department of Fish and Game and the California Abalone Association, Swint and Handelman obtained leases to a number of barren reef areas at Santa Cruz, San Miguel and San Nicholas Islands and then, under the masthead of California Sea Farms and using reseeding methods formulated by Swint, they began planting red abalone — the species most desired by commercial divers and their buyers.

"The idea is not so much to put down the abalone and return to get those same abalone later on," Handelman said. "But it's to place a population of breeding animals in a protected environment where they can reseed themselves." He explained that when the abalone reaches about two inches in length it begins to spawn, sending millions upon millions of its seed into the ocean currents. In six to ten days, the spawn will drift for miles from its release site, and the hope of the planters is that some percentage of the spawn will develop into whole new populations. "We believe in the future of the resource," said Handelman, "and we're trying to help make it happen."

The 1980 abalone harvest is reported by Fish and Game at 1.4 million pounds, compared to an average of four million pounds per year through the 1960's, and to many that means the future of the resource Handelman speaks of is in serious trouble. "There was not a reasonable management program until just recently," said Handelman. "For years there were 500 or more commercial divers operating up and down the California coast, as compared to, say, Australia, where there is one diver per 200 miles. Today, there are about 150-175 commercial licenses granted by the Fish and Game, but this cutback didn't come soon enough."

Win Swint places kelp in an abalone nursery. The young abs will feed on the algae.

More than 75 percent of California's commercial diving fleet is located in Santa Barbara, which is 90 miles north of Los Angeles. Figures indicate a total of perhaps 20 commercial boats working out of San Diego, Half Moon Bay, Catalina Island, Ventura and Morro Bay. By contrast, Santa Barbara has more than 100 commercial diving boats. A good deal of abalone mariculture news comes from Santa Barbara, where divers work with marine biologists on techniques for massive abalone planting.

Local seafood processors in Santa Barbara are presently providing shells to a UCSB Mariculture Foundation project which involves mixing larval abalone with ground-up abalone shells. The microscopic animals readily attach themselves to the shell particles, and

Abalone Poachers Caught

Felony conspiracy charges were filed in March in Santa Barbara Superior Court against 13 persons accused of participating in a statewide conspiracy to market abalone illegally taken from Northern California ocean waters. The traceable loss of abalone to the state in the area was valued at more than \$231,000 by DFG investigators. But a DFG Marine Patrol Inspector said the present case, large as it is, may be only the tip of an iceberg in a conspiracy that could involve hundreds of thousands of pounds of abalone valued in the millions of dollars.

Two major investigations marked the year-long case, one a covert operation to determine who was taking abalone illegally and where and how they were being marketed. This operation also involved agents from the National Marine Fisheries Service, the Bureau of Alcohol, Tobacco and Firearms; the Mendocino County Sheriff's Office and the California Department of Justice.

Other charges filed in the case involve various violations of the Fish and Game regulations, including failure to file records with the department and avoidance of fish taxes.

the idea is that the entire swill of microscopic living abalone, sea water and shells can be simply tossed overboard in a suitable site at the offshore islands. The abalone, weighted by the shells, would conceivably drop to the bottom and begin to grow.

Meanwhile, Handelman and Swint have formed another organization called Save Our Shellfish, which is working to head off what they consider another potential disaster: the arrival of the sea

otter to the Channel Islands. Sea otters eat a variety of seafoods, including abalone. With this in mind, Handelman says, "If the sea otters are allowed in this area, our replanting program would be like growing corn for the crows."

S.O.S. advocates a state zonal management program for the sea otter, which would remove control from the federal government as established under the Marine Mammal Protection Act of 1972. Because the state has jurisdiction within the three-mile limit, it could more accurately manage the sea otter/shellfish conflict, according to S.O.S.

Conservationist groups — Friends of the Sea Otters in particular — oppose the efforts of S.O.S. in relation to the otter. The Friends have been trying to organize a transplanting of otters to San Nicholas Island, and Margaret Owings, founder of the otter group, says that San Nicholas is the only spot she knows of in California that can take a transplanted population of otters because it is a site "unthreatened by oil spills or gill nets."

S.O.S. maintains that San Nicholas is the gateway to all of the Channel Islands, and that the transplanting of otters to that particular spot is not reasonable management of either species. "If the otters are transplanted to San Nicholas," says Handelman, "that's it — that would be the end of the shellfishing industry in this area." The shellfish/otter controversy has many more arguments on both sides, and the final outcome of the conflict is still a long way off.

There's another fly in the abalone soup which assumed drastic proportions at the end of last year in Santa Barbara: poaching. The Santa Barbara divers, familiar with the abalone beds of the Channel Islands, say they know which beds have legal sized abs and which do not, and that they're finding entire beds of undersized abs ripped off. "Sometimes you'll see dozens of shells, shucked topside and thrown overboard," said Jim Colomy, a commercial diver and partner in a seafood processing firm. The illegal abalone is being sold to restaurants up and down the California coast, say both divers and processors. (See sidebar: Abalone Poaches Caught.)

High prices make poaching attractive. In 1975 a diver received \$30 to \$40 for one dozen red abalone; today he receives anywhere from \$100 to \$150, and the wholesale price of abalone is \$18.50 to \$20.00 a pound.

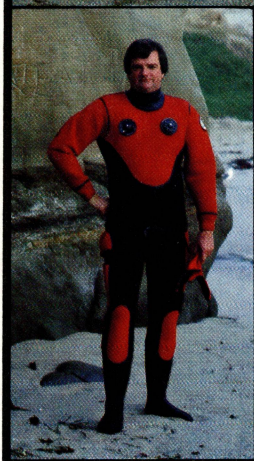
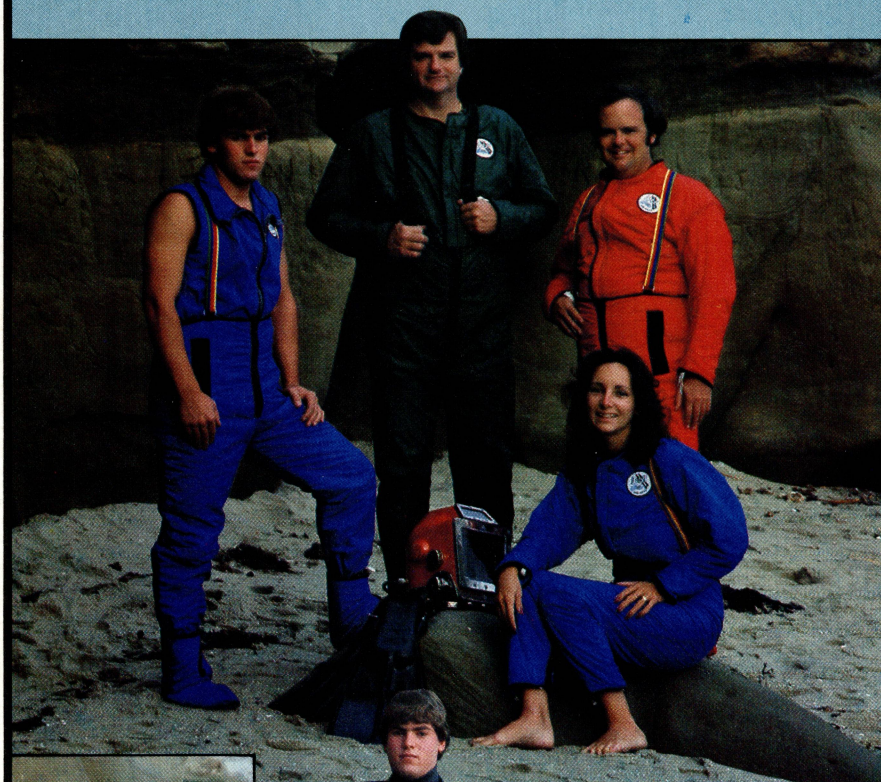
For some commercial divers, already limited by seasons and the weather, the poaching situation is a direct threat. If restaurants don't buy from the processors, the processors don't buy from the diver, and the diver is without his rent.

Illegal taking of abalone can result in stiff fines and the permanent loss of the commercial license, which is difficult to

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ABALONE DIVERS

come by. Commercial divers depending on their licenses for their livelihood don't take shorts, and when the California contingency felt that the poaching needed to be checked, they participated in a watchdog program called Cal-Tip. Cal-Tip offers \$1,000 rewards for tips on illegal diving activities reported to the Fish and Game that lead to the arrest and conviction of the violator.

Commercial divers also have the problem that comes with just being in the water so much of the time. Even though successful abalone divers can make their way in the shallows, entire days underwater push them into decompression anyway. Divers wearing more than one decompression meter have still been hit in elbows, knees or shoulders at least once, and a few of them have lost the use of a muscle here or there. The very unlucky ones walk with canes or, worse, get around in wheelchairs.

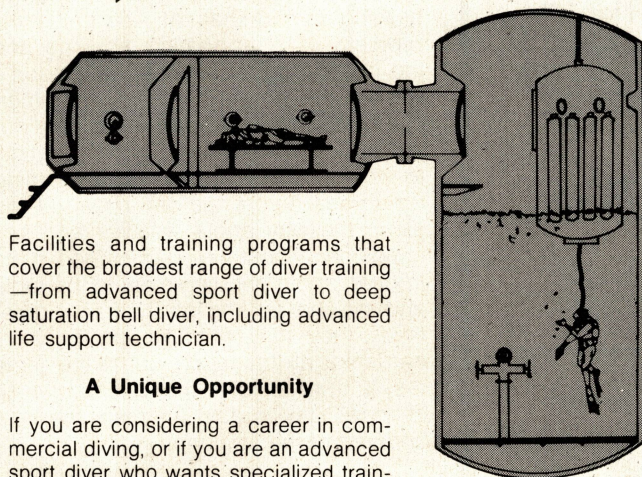
Another side effect of being in the water so much is exposure to sharks. Not horn sharks, swell sharks or blues — but the great whites which roam every ocean and feed near seal rookeries. Rookeries can also produce a high yield of abalone. Most commercial divers stay away from such areas when the water isn't clear, but even so, there are those chance encounters that no one likes to think about.

Gary Johnson, an abalone diver from Santa Barbara, was diving the foul area off Point Conception in July of 1975 when he saw his first white shark. He described his reaction as "mild cata-tonia" — which is how most white shark encounters affect divers. Johnson estimated the shark to be 15 feet long and "as big around as a whisky barrel."

Four days later, a diver named Rob Rebstock happened to anchor his boat in the exact spot where Johnson had seen the shark, and the next thing Rebstock knew, he was in the mouth of the very shark Johnson had seen. "It took me all the way out of the water in its mouth and dropped me closer to the boat," Rebstock recalled. Rebstock was diving again in two months, but his astonished friends stayed out of the water for years.

There are other stories that commercial abalone divers tell: Win Swint was diving off a seal rookery once when a killer whale came in to feed, and amid the blood he made his way back to his boat "trying very hard not to look like a seal." Another commercial diver named Jay Worrell tells how a group of divers took up a collection to pay for his

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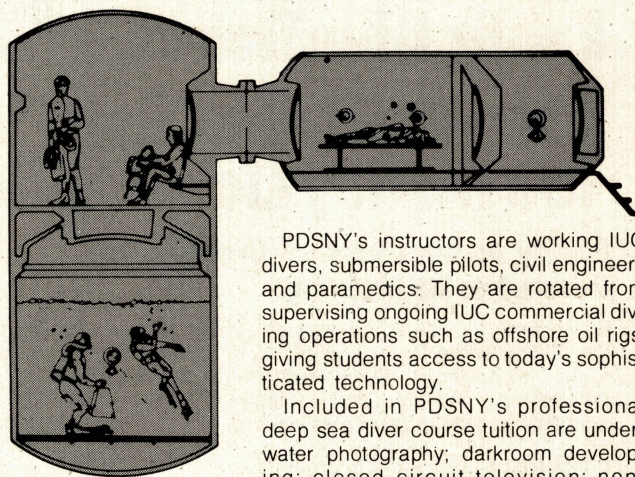
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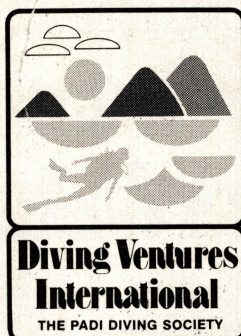
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ABALONE DIVERS

hospital bills after a white shark bit him in the rear end off San Miguel. Other divers talk of their boats sinking and of engines blowing up mid-channel. Add to this the problem of disappearing abalone and the poaching predicament, and people will wonder all the more why commercial divers continue to do what they do.

The divers themselves don't take time to wonder. They are the ones heading out to sea before the sun rises, talking along the way about weather and sea conditions, about foraging for food in the frontier, about bringing meat to the table and making a living off the sea. Sometimes they may not like the physical hardships all that much, but all the same they'll always love the ocean, which changes day to day. It's man, the sea, and lure of the abalone.

REEF FISH HANDGUIDE

In the April issue of SDM the New Books section featured the *Handguide to the Coral Reef Fishes*. Because of space limitations the address of the publisher was abbreviated to the city and state. The complete address is: Publications Department, Academy of Natural Sciences, 19th and Parkway, Philadelphia, PA 19103.

ADVANCED DIVER PROGRAM

The 1982 Los Angeles County Advanced Diver Program is scheduled to begin on July 9. This very comprehensive program is designed to improve the academic knowledge and water skills of any certified diver, whether novice or experienced. It will consist of nine Friday night lectures (through September 24), given by experts in their fields, covering all major aspects of advanced diving, including: equipment; emergency procedures; search and salvage; U/W navigation; spearfishing; game taking; U/W photography; and boat, wreck, and night diving.

Open water dives will be conducted on the Sundays following the lecture sessions, and will offer the opportunity to gain practical experience in these same areas. The program will be presented by the Los Angeles County Underwater Instructors Association (one of the oldest diving instruction organizations in the United States), and sponsored by the County of Los Angeles, Department of Parks and Recreation.

For information concerning this challenging program, contact Mr. Ben Cariaga at 419 E. 192nd Street, Carson, California 90745; phone (213) 327-5311.

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Nestled deep in the Pennsylvania Dutch countryside, Willow Springs Club is a combination swim area, fishing spot, dive facility and campground. Also known as Richland or Meyerstown Quarry, it's centrally located between Hershey and Reading. Its 25 acres of cold, spring-fed waters are filled with artifacts from its former industry. The club's popularity stems from the quarry's comparatively shallow depths (50 feet), good visibility (up to 35 feet) and many interesting, more recently added underwater sights. Also, more than 600 instructors have brought their classes here for either all or a portion of their open water training.

The club's origin — as an open mine where workers toiled long, back-breaking hours removing crushed stone — predates the turn of the century. In the 1880's, high demands by construction firms for traprock created the need for the quarry. Igneous in nature, traprock's tendency to overlap and

Disaster struck the mining operation at Richland as an underground spring found its way through one of the side walls. Within a day, it was two-thirds full of water and the steam crane, railroad tracks and switch house were abandoned. The mining operation at Richland shut down December 4, 1929, a year to the day after mechanization. Spring water now flows in at the rate of 44,000 gallons per minute.

For the next 29 years Richland was used primarily by fishermen and swimmers. Authorities also found a use for the waters of Richland. Slot machines were dumped there after seizure by the government as contraband.

In 1958 Nathan King purchased Richland Quarry to develop it as a fishing club. That same year the television series *Sea Hunt* was syndicated. As the sport of diving became more popular, so too did the underwater sites at Richland. King realized the potential it had as a diving attraction. It was slow

It's The Pits

Yesterday's Toil Pits Are A Pennsylvania Paradise For Divers

Text and Photography by Rod Canham



interlock makes it an ideal building material. Its early usage was primarily as foundation stone in house construction and it is now used as a concrete aggregate in road building.

Richland Quarry was originally dug with pick, shovel and TNT. Wages were a scant \$1.20 per day but during the mid-1890's the U.S. was still reeling from two depressions. Work was scarce and the mining operation provided a source of income.

Relief came to Richland Quarry in the form of mechanization on December 4, 1928. A steam crane was incorporated to remove the traprock. Tons of the crushed stone was transported out on small railroad carts.

going for the new club, called Willow Springs, and almost six years before it became self supporting. Nathan and Leesa King are very special people. Incoming visitors are warmly greeted and soon made to feel welcome.

One of the first stages in developing any new area is cleaning up, and Willow Springs Club was no exception. Divers ambitiously pitched in to help remove 18 loads of bottles and cans. It's a practice that has been maintained ever since. The quarry is virtually free of trash.

Willow Springs Club has been a testing site at different times. In 1968 the government installed a truck tanker at the northeast edge of the quarry, midway up from the bottom.

There, human stress tests were performed until 1971. The habitat still remains as one of the sites on Willow Springs' underwater trail. Although the air inside is no longer breathable, it's still fun to climb inside for a look around.

In 1976 two partners set up an air station and small dive shop across the road from the club. Now owned by Harold Ebright, the Jolly Roger is a full service dive shop providing service to over 20,000 divers per year with easy access for air, repairs, rentals and sales.

One of the favorite features at Willow Springs Club is the *Quest*. Mounted like a model ship, this 72 foot long vessel sits on the bottom of the quarry with only the tip of its main mast above the surface. The *Quest* has quite a notorious history. Built in the 19th century as a racing vessel, she served during World War II as a patrol boat and later as a trawler. She was found derelict and adrift, and the Coast Guard towed her to

Otten's Harbor in New Jersey. With her bilge pump off, she soon sank in over 100 feet of water. After being refloated, the *Quest* was towed to Penn's Landing in Philadelphia. There she was used as an on-land ghost ship exhibit for the nation's bicentennial celebration. Having been notified of its availability, King hired a rigger, had the masts and pilot house removed and the ship cut in two. It was transported the 360 plus miles from Philadelphia via back roads, and reassembled for a launch to its final resting place 50 yards offshore. But the *Quest*'s propensity for sinking held true as it immediately dropped in ten feet of water. Having been refloated and transported to the desired site, it inadvertently bellied up and sank. The final righting was made and the *Quest* is now nestled securely in a cradle made of eight inch thick I-beams. Its purpose is to provide wreck training in the confined safety



photos/courtesy Nathan King

Far left, a diver exits the second deck of the *Quest*. Above, an underwater stop sign atop one of the platforms. Top right, the Willow Springs Club is nestled deep in the Pennsylvania countryside. Middle right, during the 1880's workmen removed traprock from the quarry using hand tools. Lower right, the quarry's steam crane and its crew. The crane is now underwater.



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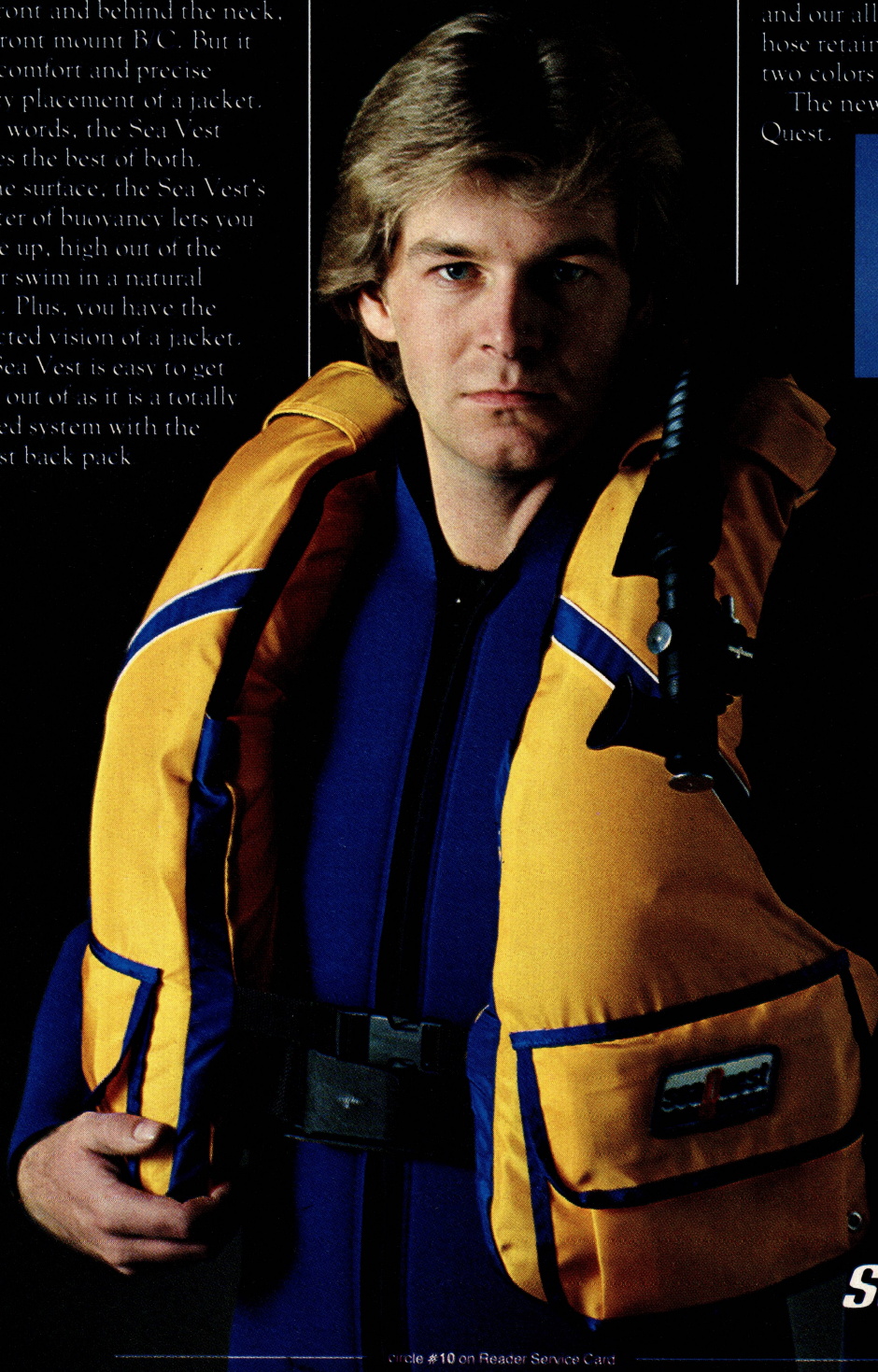
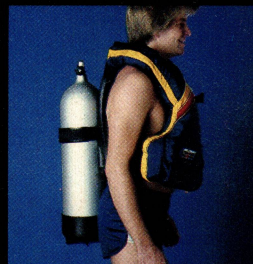
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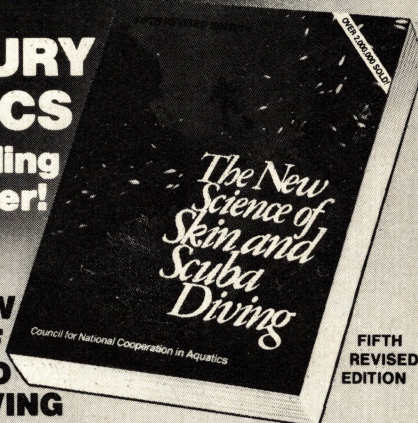
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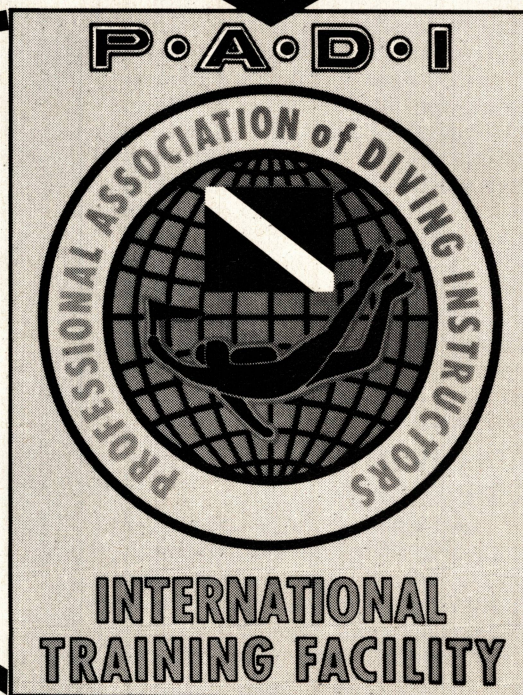
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Scuba Quiz

Category: Hand Signals

By Dennis Graver

All divers know a few standard hand signals and probably have a few of their own. There are some principles related to the use of these that should also be known, and they are not known as well as the signals themselves. Check your understanding of hand signals and how they should be used. The answers are on the following page.

1. Select the incorrect statement: To communicate effectively underwater with hand signals, it is necessary to:

- ☐ A. Review, discuss, and agree upon the signals before diving
- ☐ B. Deliver the signals in a forceful, exaggerated manner
- ☐ C. Secure your buddy's attention before signaling
- ☐ D. All of the above statements are correct

2. When receiving a signal underwater, you should:

- ☐ A. Repeat the signal to demonstrate understanding
- ☐ B. Acknowledge that the signal has been received
- ☐ C. First decide if the signaled action is appropriate
- ☐ D. All of the above

3. If you disagree with a signal you have received, you should:

- ☐ A. Attempt to explain your position via pantomime
- ☐ B. Obey the signal and discuss the difference after surfacing
- ☐ C. Shake your head no, then signal the correct action
- ☐ D. None of the above

4. There are _____ standard hand signals for the OK sign:

- ☐ A. 2
- ☐ B. 3
- ☐ C. 4
- ☐ D. 5

5. Pounding on the chest with a clenched fist means _____, while a slashing motion across the throat with an open hand means _____:

- ☐ A. Out of air, low on air
- ☐ B. Low on air, out of air
- ☐ C. Give me air, out of air
- ☐ D. Out of air, give me air

6. Pointing to the mouth underwater signifies:

- ☐ A. A desire to talk
- ☐ B. Hunger
- ☐ C. Buddy breathe or share air
- ☐ D. Breathing difficulty

7. An extended, clenched, palm-left fist is the signal for:

- ☐ A. Stop, hold it
- ☐ B. Danger
- ☐ C. Anger
- ☐ D. Stay away

8. To signal for assistance at the surface:

- ☐ A. Raise one arm high overhead
- ☐ B. Slap the surface of the water
- ☐ C. Both actions A and B are required
- ☐ D. Wave both arms high overhead

9. An open palm facing you signals:

- ☐ A. Stop or hold it
- ☐ B. Need for assistance
- ☐ C. Something is wrong
- ☐ D. Danger

10. Which of the following allows the most effective communication between dive buddies underwater:

- ☐ A. Standard hand signals
- ☐ B. Deaf alphabet
- ☐ C. Sign language
- ☐ D. Semaphore

Scuba Quiz

Answers: Hand Signals

1. D. All of the above statements are correct. For signals to be effective, they must be known and seen clearly. Nearly every diver uses some signals of his or her own design and these personal signs need to be made known to a buddy as well as the standard signals. Talk about underwater communications before a dive to help reduce frustration beneath the surface.

2. B. Acknowledge that the signal has been received. An OK sign returned, or a nod of the head lets your buddy know you understood the message. This is as important for routine signals, such as those indicating direction, as for emergency signals. Always acknowledge signals. Repeating a signal can cause problems. Imagine returning an out of air signal with another out of air sign!

3. D. None of the above. This is a difficult question to answer because the correct response depends upon the signal itself and the situation in which it is given. Emergency signals should always be obeyed, but a signal to go deeper than your planned depth should not be. Which signals are debatable and which are not should be agreed upon in advance.

4. C. 4. Everyone knows the standard OK sign made by touching the thumb and forefinger together, but don't forget the signal can also be made by curling all the fingers to the thumb when a mitt is worn. Touching the fingertips together overhead is the long distance surface signal for OK, but touching the fingertips of one hand to the top of the head is also acceptable when one hand is occupied.

5. B. Low on air, out of air. These two signals are frequently confused, and are very important. They deserve immediate comprehension. If you will think of the slashing motion of the out of air sign as an indication that the air supply has been cut off, it may help distinguish the signal from the low on air sign.

6. Buddy breathe or share air. Technically, a person who loses the supply of air should signal out of air, followed by the signal to share air, made by pointing to the mouth with the regulator removed. However, any time a diver approaches you with the regulator removed and pointing to the mouth, you should immediately respond by providing the diver with air. Confusion in such a situation can result in an accident.

7. B. Danger. The fist is to be extended in the direction of the hazard and held there until your buddy recognizes and acknowledges the object or situation. Don't hesitate to use the signal for minor hazards, such as a spiny fish which is well camouflaged. Diving is at its best when buddies are helpful to each other.

8. C. Both actions A and B are required. Even though they are not supposed to do so, divers still wave to other people. To distinguish between these salutations and a true emergency, the following signal has been established as the diver's distress sign: Raise one hand straight up high overhead and bring it down sharply, slapping the surface of the water. Repeat as needed until acknowledged.

9. A. Stop or hold it. This signal can also mean stay there. People usually understand this signal even if they have forgotten others because the stop signal is common in everyday life. There are numerous other signs which can be used underwater to improve communications between divers. All you need to do is develop them, discuss them with your buddy, and agree on them before use.

10. C. Sign language. Precise communications are possible with sign language. There are several languages for the deaf, but Exact English allows communication using the same wording structure used in normal conversation. A semester or two of sign language classes with your buddy will significantly enhance your diving through markedly improved underwater communication.

The old adage that we get out of something only what we put into it is certainly appropriate when it is applied to hand signals. Did you get seven or eight correct answers? If not, you need to review your signals and the procedures involved in their use. And, no matter what your score, why not learn the deaf alphabet? It will be useful to you in many ways.

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Sunlight is usually the most important light source for wide-angle U/W photography. In clear, shallow water, a wide-angle lens can easily cover such a broad picture area that the bottom, mid-water background and even the surface above are included in a vertical format. In this case, you begin with an exposure meter reading and set the aperture for the highlight areas, and use strobe lighting to restore color and detail to near subjects.

This lighting style creates an illusion of reality. The picture gives the viewer a feeling of what it actually looks like underwater. You, of course, know that your strobe added a touch of color to the natural scene. But as long as your strobe lighting is subtle, and doesn't draw attention away from the natural appearance of the scene, the viewer accepts the scene as reality.

Even in darker, turbid water, minimizing the amount of strobe light used often

produces better pictures. Get lower than your subject to silhouette it against the lighter surface and midwater background, and open the aperture for a sunlight exposure. Move in as close as possible to minimize the number of suspended particles in the water and use just enough strobe light to gain the needed subject detail. Try using strobe light that is about one stop weaker than the sunlight exposure. This reduces the amount of flare caused by the strobe

SPREAD

your light around and cover those wide-angle exposures

Text and Photography by Jim and Cathy Church

light striking suspended particles in the water. You may, of course, need to use a fast film (ASA 200 or 400) that allows you to close the aperture enough for sufficient depth of field. The key point is to avoid blasting your subjects with excessive strobe light that will illuminate the suspended particles.

There will be situations when it's best to turn the strobe off and expose with sunlight only. The silhouettes of the dive boat and divers above you, or a diver

silhouetted in a crevice can be effective pictures without the addition of strobe lighting.

AIMING THE STROBE

If you've been using a 35 mm or 28 mm lens with a normal-beam strobe in the past, and will now be using a 20 mm or 15 mm lens with a wide-beam strobe, some of the habit patterns that produced good lighting will now become liabilities. For example, consider the common strobe

position — held or bracketed at the upper left of the camera and aimed downward and inward toward the center of the picture area. While this may be a good position with a 35 mm lens, the strobe head could easily show up in the upper left corner of the wide-angle picture. Or at the least, you will see flare in the upper corner where the wide-beam strobe light reflects back from the suspended particles in the water. Now, you may need a longer strobe arm because you must hold the strobe further away from the camera.

Although the strobe can be aimed at the subject from a variety of angles, let's begin with top lighting. Hold your wide-beam strobe several feet above the camera, and aim downward and outward toward the center of the picture area. Because your eye is accustomed to seeing light falling on subjects from above, the lighting appears natural in the picture. Aiming from this position also spreads the light more evenly to the left and right sides of the picture.

But top lighting isn't always best: If your subject is a diver who is facing to the left in your picture, aim the strobe in from the left side so the face and BC are illuminated; if the diver is facing to the right, you can hold the strobe arm in a cross-arm grip and aim the strobe in from the right. Or, if the diver is swimming down to you from the surface, aim the strobe from below the camera.

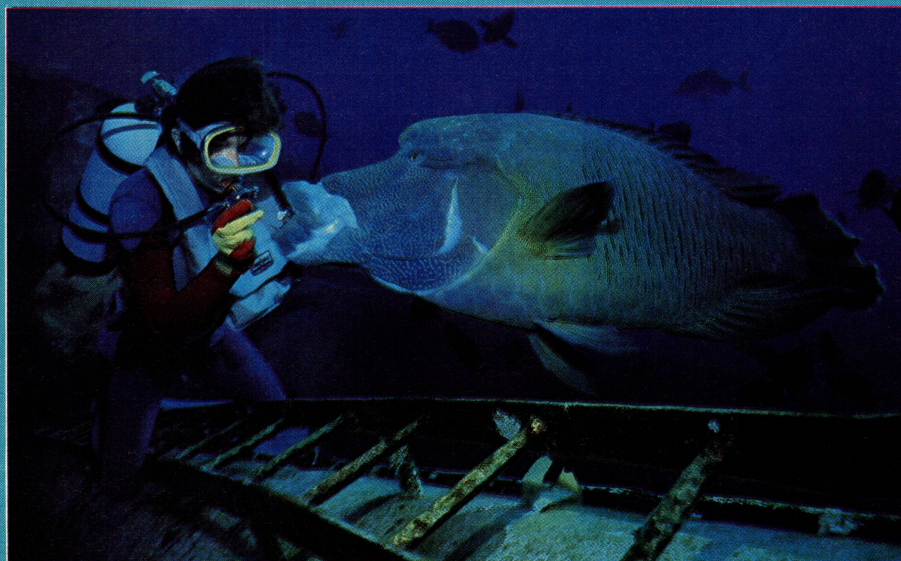
Learning which lighting angles are best with different subjects takes time. And sometimes you can use different angles with the same subjects to create different moods.

Deciding on a lighting angle is one thing, but aiming the strobe correctly is another. As you watch your subject's image in the viewfinder, the wide-angle perspective you see may upset your hand-eye coordination as you try to aim the strobe. To improve your aim, try the following techniques:

1. Attach a small, narrow-beam light (such as a Q-lite with an adjustable holder) to the strobe. Then, as you watch the subject's image in the viewfinder, aim the strobe by aiming the narrow beam of light at the desired subject area. And when you see the light strike the desired subject area, take the picture. This technique works best, of course, with near subjects and when sunlight doesn't overpower your light.

2. As you watch your subject in the viewfinder, move the strobe in until you can see the front of the strobe head in a corner or edge of the picture area. Now that you have a visual reference for its position, use your hand-eye coordination to pull it back out of the picture.

3. If you are aiming by hand-eye coordination alone, be careful that you don't aim at the subject's apparent image. If you aim the strobe at the image you see,

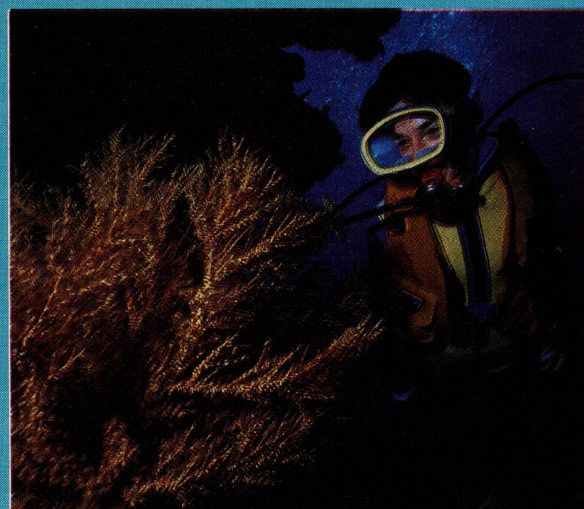


Above: the background was darkened by one stop to diminish its importance while strobe light added color to near subjects.

Upper left: sunlight exposures without strobe light are sometimes best for silhouettes and scenics.

Lower left: the aperture was set for an exposure meter reading of the background and strobe light added color and detail to near subjects.

Opposite page: a sunlight exposure without strobe light emphasizes immense wreck.



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by the feel of the strobe arm in your hand, aim at a point one-third further away (behind) the subject. Why? Because of refraction, underwater objects are actually one-third further away than you see them. If you are aiming with a light, of course, you won't have this problem.

NORMAL-BEAM STROBES

Small, normal-beam strobes (which usually cover a Nikonos 35 mm lens, or equivalent lens of a housed camera), can be used to accent selected subject areas. However, high-powered, normal-beam strobes can cause problems: If you open the lens for a sunlight exposure, the narrow beam of light shoots out like a spotlight. It brightly illuminates suspended particles within the beam and often overexposes any near subject area it hits. And, because you must close the

lens inside caves or wrecks that are filled with schools of reflective fish: If you use a small aperture for a strobe exposure for the nearest fish, you automatically darken the background. Thus, you lose your main subject — the inside of the cave or wreck. And, if you open the aperture for a strobe exposure of a background diver, the near fish will be overexposed.

Here are some basic techniques for solving the above lighting dilemma:

1. Because low light levels force you to use wider apertures which reduce depth of field, it may be advantageous to use a fast film such as ASA 200 rather than ASA 64. Yes, the faster film will have more grain, but picture sharpness will improve.

2. Take an exposure meter reading of the midwater background at the entrance of the cave or opening in the

back toward the bulkhead. This provided soft, bounce lighting on a school of highly-reflective fish inside the hold.

6. Because the fish may dart around at the moment you trigger the shutter, or a current may make it difficult for you to hold the camera steady, it may be difficult to take a really sharp picture of the fish against the light background. Thus, the new Nikonos IV-A (which synchronizes with strobe at 1/90 second rather than 1/60 second) would be a better choice than an older model if you use strobe.

LIGHTING DIVER PORTRAITS

Wide-angle lighting can also be used to diminish the importance of the background and accent the near subject in a wide-angle picture. For example, assume you are taking a diver portrait,



Schools of reflective fish inside wrecks and caves can be difficult to photograph when silhouetted against an opening. Strobe lighting must be balanced with the sunlight exposure for the background. This can be accomplished by switching the strobe to a lower power, or by holding the strobe back to increase strobe-to-subject distance, or by covering the strobe reflector with a thin cloth.

aperture for the powerful strobe exposure, the majority of the picture area will be underexposed unless there is extremely strong sunlight contributing to the exposure, or you are shooting up into the sun. The wider the lens and the closer the camera-to-subject distance, the more apparent these problems become.

For best results, turn the strobe to its low power setting, place a diffuser or neutral density filter over the reflector (if the strobe has these optional features), or attach a couple of layers of cloth over the front of the reflector with rubber bands. Then, use the reduced light output of the narrow beam to softly spotlight selected subject areas, such as a diver's face and upper body.

FAR AND NEAR SUBJECTS

Wide-angle lighting gets tricky when you have different subjects at different distances from the camera, and especially when the near subjects are highly reflective. This is a classic lighting prob-

wreckage before going inside. By metering at the opening, the dark sides won't influence the meter to overexposure. Also, preset the aperture and focus before going inside where it may be dark. If you anticipate making changes in the dark, take a moment and practice feeling the click stops on the controls.

3. Get inside and work for a silhouette. Use the entrance of the cave or opening in the wreckage to backlight the distant fish and/or diver.

4. Reduce the intensity of the strobe so the exposure for the close, shiny fish will balance with the sunlight exposure for the distant opening. You can do this by (a) turning the power switch to the lowest setting, (b) holding the strobe back to increase distance to the nearest subjects, (c) placing layers of cloth over the reflector, or (d) a combination of these techniques.

5. Another method we've used, when a bulkhead in the hold of a sunken ship was behind us, was to aim the strobe

and wish to darken a prominent or cluttered background that could draw the viewer's eye away from the diver. You can accent the diver by moving in close and holding your strobe close enough to the diver so it overpowers the sunlight exposure by at least a full stop. Closing the aperture for this strobe exposure automatically darkens the background which reduces its importance.

On the other hand, suppose the background is important to the diver portrait. If, for example, the diver is exploring interesting U/W terrain or wreckage, the background may be an important secondary subject. If so, and the water is bright and clear, set the aperture for a sunlight exposure and hold the strobe back (or turn it to low power) and use it for fill lighting for your portrait.

If your subject has a translucent mask, strobe light can penetrate the side of the mask and light the face. If the mask isn't translucent, make sure that you aim the
(Continued on Page 70)

WALLIN DIVESTORE MOVE

Wallin Divestore of San Carlos, California has moved to larger premises in nearby Redwood City. The new store, on East Bayshore Road, is alongside Bayshore Freeway. It has 3000 square feet of showroom space and offices on the second floor, with a classroom and hydro station on the ground floor. Customers use a dumbwaiter to carry tanks, rental returns etc. to the upstairs dive store.

Other features of the store include a gallery showing selected underwater photographs by dive store customers. The underwater photographic equipment section of the store has been expanded and owner Karl Wallin will continue to give free monthly seminars on various aspects of underwater photography. Custom printing by Karl will also be available for the store's customers.

For information contact Karl at Wallin Divestore, 517 East Bayshore Road, Redwood City, CA 94063; (415) 592-7606 or 369-2131. 🐠

SEMI-SUBMERSIBLE RIG

A New York City based commercial diving firm has begun bell diving operations from the semi-submersible drilling rig, Rowan-Midland, now working in 280

feet of water on Georges Bank, some 150 miles east-southeast of Cape Cod.

The area is difficult for diving because of its frequent storms, high waves, strong currents and fast-moving tides. "We're usually limited to a 30 to 40 minute operational window every eight hours," reported International Underwater Contractors' Bob Sikorski late last fall. "Then the current builds up to three knots."

The six man dive team is staffed fully by Professional Diving School of New York graduates. School director Glenn Butler recently took his regular supervisory tour on the job. "It's like a mini-North Sea," recalls Butler, whose own work — spudding in — was interrupted by 40 foot seas over Christmas. That's a little too much for even the best professional divers. But the huge semi-submersible can keep right on drilling — from 600 feet to 25,000 feet below the sea bed — in seas 50 feet high. 🐠

PHOTO CHAMPIONSHIPS

The San Diego Council of Divers, Inc.; Oceanic/Farallon, the Kodak Corporation; Aqua Craft; and Photic of San Diego are hosting the Fourth Pacific Coast Underwater Photographic Championships (PCUPC) August 14-15 in San Diego, California. This unique and fun event is open to all underwater photographers. Divisions will be: novice, amateur, semi-professional and professional.

Categories in each division will be: macrophotography, marine life, and the diver. First through third prizes will be awarded in each category. Best of each category, best of show and first through third team will also be given.

For details and additional information write: PCUPC, Al Bruton, 4517 Maryland St., San Diego, CA 92116; or call Al at (714) 295-8652 evenings, (714) 224-2709 days. 🐠

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The Sociedad Submarina De Puerto Rico is a non-profit organization composed of experienced divers up to dive-master and instructor levels. As part of a public service interchange program, it is interested in providing orientation to experienced divers visiting Puerto Rico. This will include space on scheduled dive boat trips planned on a monthly basis at very competitive club rates. Advanced sites visited usually are not offered by local commercial operations. Visiting divers must bring or procure their equipment locally and trips are subject to space available, so advanced notice is necessary. Certification and open water experience are required.

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Parkway Fabricators has a new BC. Called the Ocean Jacket, it incorporates all the latest features.

As with most modern buoyancy compensators, the Ocean Jacket has a two bag design. The inner bag is made of tough 15 mil urethane, the material proven to be the most durable under assault by ocean elements. The outer bag is made of rugged lightweight 420 denier nylon.

With the Ocean Jacket, Parkway has eliminated one problem common to two bag BC's: Drainage of water between the bags. Parkway solved this nuisance by placing nylon mesh drains at both the top and bottom of the outer bag. The one at the bottom allows water to drain during use; the one at the top allows drainage of water during cleaning (when the jacket may be rinsed upside down).

The Ocean Jacket is designed to be compatible with most backpacks. Parkway has placed a reinforced pad on the back of the jacket to eliminate damage to the compensator due to abrasion from the backpack.

COMFORT

The smooth nylon outer bag of the Ocean Jacket is especially comfortable against your skin. The weight of the scuba tank is supported by your shoulders, as with any backpack. But, instead of heavy nylon backpack straps

biting into your skin, you feel the soft nylon of the Ocean Jacket's outer bag. And, the design of the arm holes prevents any seam from rubbing on your skin. These features make diving without a suit especially enjoyable. And, when you do wear a suit, this design eliminates wear to it owing to strap abrasion.

The Ocean Jacket closes in the front with the backpack waist strap and buckle. An additional Velcro fastener helps hold the jacket closed several inches above the waist. Further modification of the jacket's waist size can be accomplished by adjusting straps on each side panel.

ACCESSORIES

Attached to the front of the Ocean Jacket are two pockets large enough to carry dive gauges, large sea shells, or an underwater camera. Like the outer bag, these pockets have nylon mesh drains at the bottom. Inside each pocket is a stainless steel ring attached to a short strap. These allow you to secure gauges, car keys, or other articles. Two additional

stainless steel utility rings are attached to the base of the jacket below each pocket. These may be used for securing larger accessories such as hand lights or game bags.

On each side of the Ocean Jacket there are Velcro hose retainers with which you can secure your pressure gauge and your octopus.

The Ocean Jacket is designed with a buckle below the backpack pad to allow the use of a crotch strap. Although most divers find buoyancy jackets perfectly comfortable without a crotch strap, Parkway has provided this option for those who prefer it.

INFLATION

The Ocean Jacket comes standard with Parkway's new Softouch power inflator. This wonderful innovation eliminates the necessity of gorilla-like strength in the hand and forearm in order to activate the button on your inflator. This mechanism allows feather-touch inflation control.

The Softouch inflator is attached to a short spiral hose which, unlike some, allows

complete water drainage when cleaning. This hose is secured to the front of the jacket with Velcro.

Oral inflation is also possible with a purgeable valve. This allows you to expel water from the mouthpiece so it doesn't get blown into the jacket. When completely inflated, the Ocean Jacket provides 48 pounds of lift in salt water.

Emergency inflation can be accomplished with a CO₂ mechanism beneath the left pocket. This mechanism is made of durable corrosion-proof plastic.

Overinflation is prevented by an over-pressure valve on the back of the jacket.

DEFLATION

Two models of the Ocean Jacket are available: The Quick Dump and the Pull Dump.

The Pull Dump is on one shoulder and is activated by pulling a cord. The Quick Dump is at the top of the inflation hose itself. You simply pull on the inflation hose to activate the valve. The Quick Dump valve makes deflating your jacket as easy as inflating it and is certainly worth the additional investment.

The Parkway Ocean Jacket is available in blue with silver trim. The retail price for the Quick Dump (VES 51223) is \$264; the Pull Dump (VES 41223) is \$246. See your Parkway dealer. 

Parkway Ocean Jacket

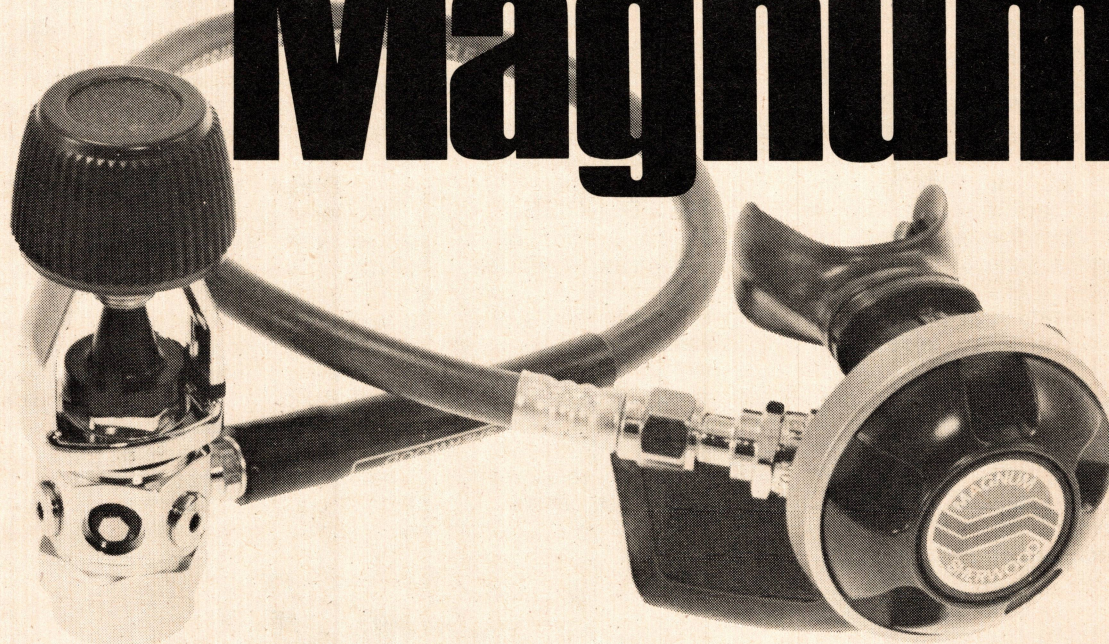
For super
comfort

Text and photography by Howard Hall



The Parkway Ocean Jacket has large pockets and comes standard with power inflator and overpressure valve.

THE MAGNUM

the
Magnum

TEXT AND PHOTOGRAPHY BY GEORGE COZENS

It was during the Roaring 20's, the days of bathtub gin and daring young flappers (1926, to be exact), when Sherwood Selpac first started making precision valves and regulators for the control of gases. Through the years these products have found an increasing variety of applications in industry, research, medicine, and more recently, the field of recreation. For a number of these years, Sherwood Selpac manufactured a variety of components for scuba valves and regulators which were marketed under the trade names of other dive equipment manufacturers. Then, in 1974, the company introduced its own line of dive equipment, under its own name. This line was expanded in 1980 with the addition of two new regulators, the Magnum and the Magnum Blizzard.

The two regulators are almost identical. There is essentially only one difference between them: the Blizzard has a heat retention unit in its second stage. This collects heat from the diver's exhaled breaths and transfers it to the

demand lever valve to reduce the chances of freeze-up. With the exception of this one item, everything said about the Magnum also applies to the Magnum Blizzard.

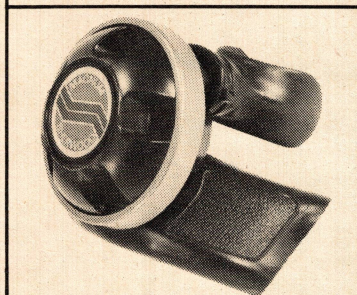
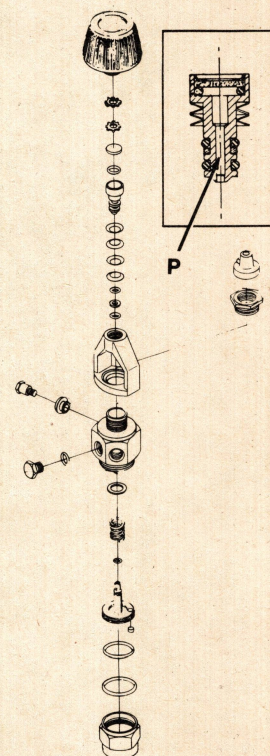
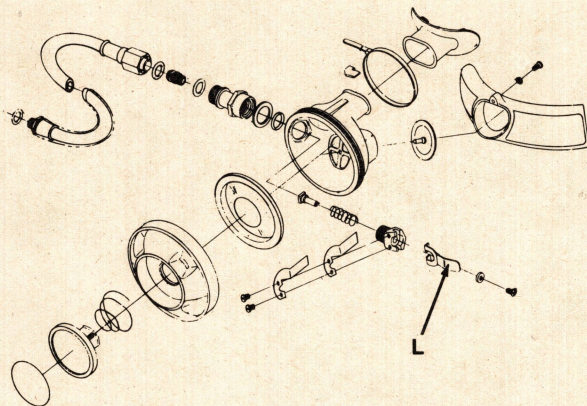
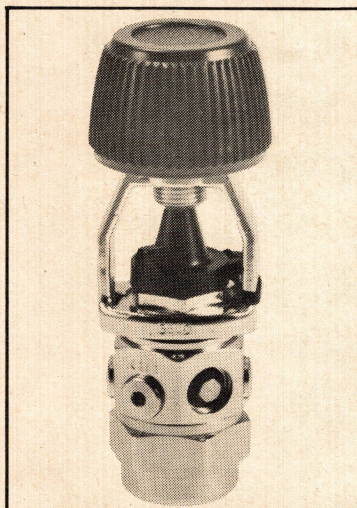
THE FIRST STAGE

The Magnum is a rather conventional regulator in appearance, but offers some very interesting features that aren't apparent in a casual inspection of the exterior. The first stage (model SRB 3205) is basically a balanced piston design, with a heavy duty, chrome plated, marine brass housing, one high pressure port, three low pressure ports, a swivel yoke (rated at 3500 psi), and a large yoke screw knob. For a piston-type first stage, its body is very compact.

The method used to balance the first stage against changing tank pressure is called a floating orifice balancing system and is worth some attention. This floating device, which looks and behaves just like a piston, is so named because it floats (i.e., slides in and out, depending on tank pressure), and because one end forms

the orifice of the first stage valve. When the valve is closed, the orifice seals against a Teflon valve seat. But this is attached to the end of the main piston which also slides back and forth, opening and closing the valve whenever the intermediate pressure changes (owing to inhalation, purging, or changes in ambient pressure).

Suppose we connect the first stage to an air supply. As high pressure air enters, it pushes the floating orifice (piston) slightly into the body, compressing several spring (or cup) washers in the process. The air travels down the center of the orifice piston, forces open the valve and flows into the intermediate pressure chamber (which feeds the low pressure ports). From this chamber, the air can pass into the center of the main piston and flow down its length, where it applies a force on the end of the piston, closing the valve. The valve will not close, however, until the intermediate pressure has overcome the combined forces of the regulating spring and ambient pressure, which are trying to hold the valve open. It



Top left: The first stages of the Magnum and Magnum Blizzard regulators have a swivel yoke, one high pressure port and three low pressure ports. **Right:** The first stage has a unique dual piston system (P) which balances the first stage against changes in ambient pressure. The ambient pressure chamber is sealed against water and foreign material by air pressure. **Left and above:** The second stages of the Magnum and Magnum Blizzard have curved demand valve levers (L) which reduce the effort required to open the valve.

is these opposing forces (intermediate pressure on one side of the piston, ambient pressure and the spring on the other) that maintain the intermediate pressure at 120 psi above ambient.

As mentioned above, one of the forces acting on the main piston is ambient pressure. And, the cavity where ambient pressure can act on the piston is called the ambient pressure cavity. In typical first stages, water is allowed to enter this chamber — but when it does, it often brings with it salt, silt, and other damaging particles. In addition, cold water (e.g., fresh water of 45°F, or less), chilled by the rush of air through the first stage, can freeze solid, preventing the regulator from functioning properly. To solve these problems, some manufacturers offer modified first stages, or conversion kits, that allow the ambient pressure cavity to be filled with silicone, which transmits the ambient pressure, but keeps water and other undesirables out.

Sherwood has taken a different approach to this solution. In the Magnum first stages, the ambient pressure cavity

is filled with nothing — but air. The main piston has a restricted opening in its surface, which allows intermediate pressure air to flow very slowly into the ambient pressure cavity. This air accumulates in the cavity until the pressure exceeds ambient by about one or two psi, at which time the excess is bled off into the water through a one-way check valve. Air loss with this method is negligible. In fact, Sherwood indicates that only about one breath out of an entire tankful is lost. A side benefit of this system is a quick check on the operation. If the check valve is bubbling, then it's working.

THE SECOND STAGE

The Magnum's second stage is a downstream, demand-lever valve design. Its case is molded of Lexan; front and rear halves screw together and are secured with a stainless steel clip. The interior is contoured to give an airfoil, or venturi effect when the air flows over it. This creates a region of lower pressure inside, and sucks in the diaphragm slightly to reduce the inhalation effort

during breathing. Sherwood calls this feature the integral aerodynamic assist. Critical parts in the demand valve assembly are Teflon coated for reduced friction and wear. The exhaust valve and the diaphragm are made of silicone rubber for increased resistance to ozone and chlorine, while the large, wrap-around exhaust tee is molded of flexible PVC plastic. The purge is large and up front, easily accessible, even when wearing thick gloves.

Still another feature of this second stage is Sherwood's own variable fulcrum. This sounds like so much sales promo — but it's really a very clever idea (we could call it a clever lever), and is patented by Sherwood. As in most demand-lever designs, one end of the lever is attached to the valve mechanism, while the other end rides the back surface of the diaphragm. Movement in the diaphragm is felt by the lever, and it opens or closes the valve correspondingly. What Sherwood did was to form the demand valve end of the lever into a

(Continued on Page 106)



**a radical
departure in
camera
housing
design**

TUSSEY T-300

**TEXT AND PHOTOGRAPHY
BY GERI MURPHY**

At last, a compact underwater housing which is hardly bigger than the camera it contains! Tussey Underwater Systems, a small California firm, has introduced a new and exciting housing that is a radical departure from all underwater camera housings presently on the market. The company has built an extremely low volume, compact metal housing which is virtually molded around the contours of the camera itself. It offers the underwater photographer the capability of using a high quality SLR camera and the ability to obtain crisp, colorful, well-framed photos.

The T-300 housing will accept a variety of compact 35 mm SLR cameras including the Nikon FM, Nikon FE, Minolta XD series, Minolta XG series, Canon AE-1, Canon A1, Pentax ME-Super and many other models. Slight modifications to the interior of the housing and base-plate screw hole allow specific camera models to be fitted.

CONSTRUCTION

The T-300 is a two piece, precision cast aluminum housing which is epoxy sealed during manufacture to prevent pinhole leaks. All of the corners are rounded for sleek, futuristic styling. A handgrip is actually molded onto the right side. The exterior is finished in an attractive, metallic-blue, hard-baked enamel, and the entire interior is finished in flat black to prevent stray light reflections.

The front half of the housing contains the mounted camera, its lens and lens port. Also on this front half are the focus control, aperture control, shutter release, and EO flash connector. The rear of the housing is a bell-shaped cover which provides easy access to the camera back and quick film loading. Built into the rear of the housing are the shutter speed control knob, film advance lever and viewport for through-the-lens focus and framing.

The front of the housing has a rectan-

gular O-ring fitted into a groove on the mating surface, which butts against the rear half and seals the housing. These two halves are clamped together by four stainless steel, spring-loaded, cam-action latches. When assembled, the housing is extremely solid and very durable. Each housing is individually tested and guaranteed to an operating depth of 300 feet.

All external controls for the T-300 are one-quarter inch diameter stainless steel shafts with O-ring seals. These controls are either plastic or anodized aluminum. The gears inside the housing are all black anodized aluminum to ensure smooth operation and long-term durability.

The internal space tolerances for the T-300 are extremely close and the camera fits snugly like a hand into a glove. This tight fit is the key to the housing's amazing compactness, and there is hardly any air space whatsoever except for the lens port area.

The external dimensions of the T-300

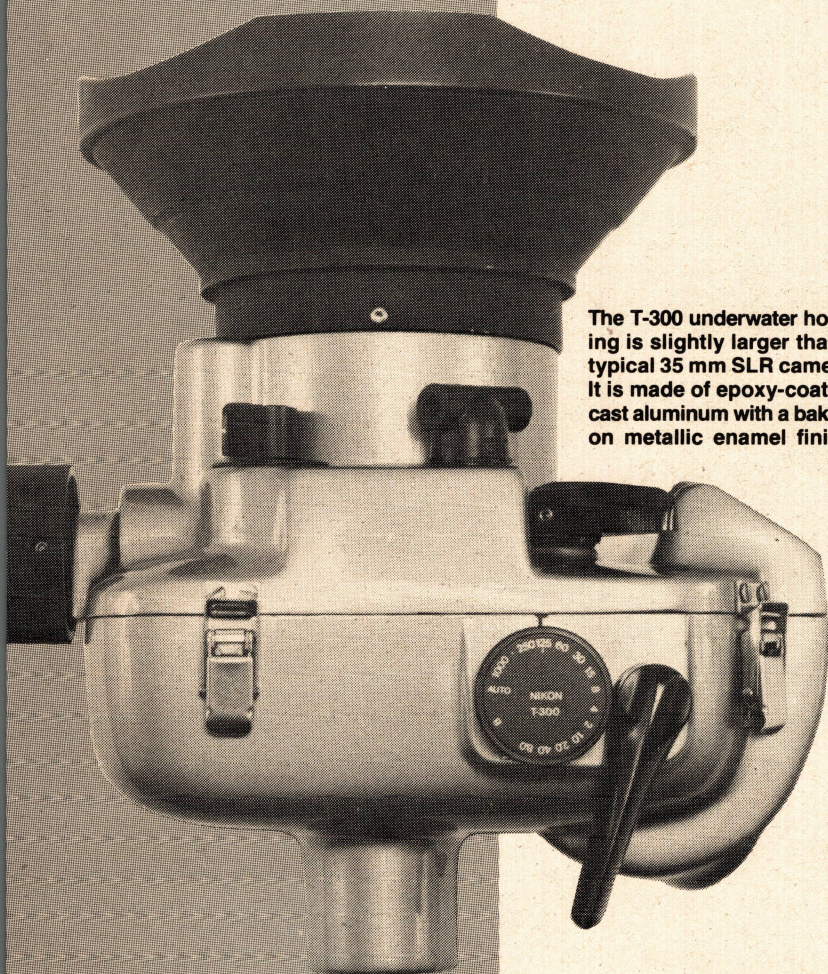
vary with the type of lens port being used. With the standard port, the housing measures seven inches long, eight inches wide and five and one-quarter inches high. It is hardly larger than a typical 35 mm SLR camera fitted with a motor drive. The T-300 will easily fit into a standard photographic shoulder bag for convenient travel to tropical resort areas. The housing with all lens port accessories, camera and lenses also fits into a Pelican

designed to accept a series of detachable and inter-changeable lens ports. Switching these ports can be accomplished in less than two minutes.

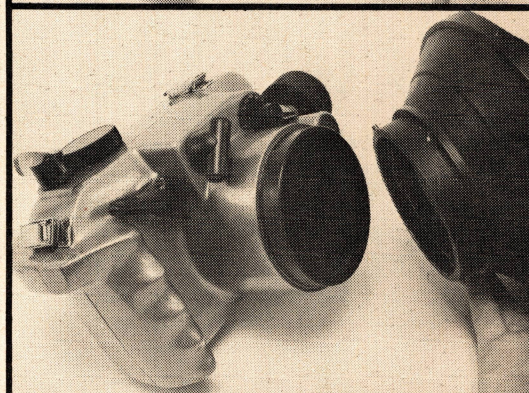
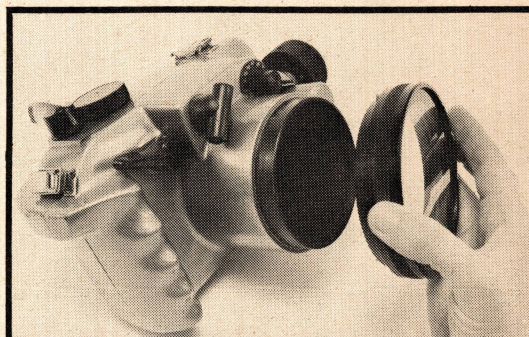
Each lens port is a precision machined black anodized aluminum collar with a cemented-in plexiglass window. Each of these contains a bore-type O-ring seal that slides over a collar on the front of the housing. The port is held securely in place by two stainless steel set screws

ameter than the standard port and three inches long. It is designed to be used specifically with such lenses as the 55 mm Micro-Nikkor. Its long barrel length allows room to focus down to nine inches. This port is especially good for fish photography and invertebrate close-ups. It can also be used with telephoto lenses ranging from 85 mm to 105 mm.

The largest of the three ports is a fully corrected wide-angle plexiglass dome.



The T-300 underwater housing is slightly larger than a typical 35 mm SLR camera. It is made of epoxy-coated, cast aluminum with a baked-on metallic enamel finish.



The T-300 is designed to accept a series of lens ports. Each port contains its own bore-type O-ring seal which slides over a collar on the front of the housing. The ports are held in place with two steel set screws.

carrying case.

The T-300, complete with camera and lens, weighs approximately six pounds out of the water. Because it is so small and compact, the housing displaces very little water and is therefore negatively buoyant underwater.

LENS PORT

One of the attractive features of the T-300 is the wide range of lenses that can be used with it. The front of the housing is

that bear down on the collar.

At present, there are three different lens ports available for the T-300. Each is designed to work with a specific range of camera lenses to ensure optimum performance. The standard port is the smallest of the three, measuring four inches in diameter and only one inch long. This port is shipped as a basic component of the T-300 housing and works quite well for lenses ranging from 28 mm to 50 mm.

The macro port is slightly larger in di-

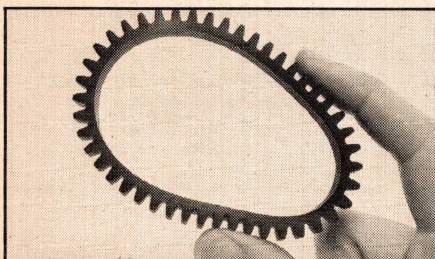
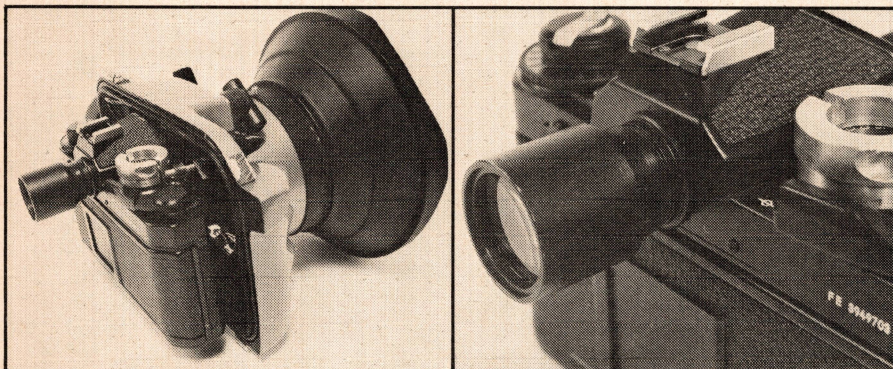
It is 6.3 inches in diameter and three inches long. This port will accommodate lenses from 24 to 35 mm.

CAMERA CONTROLS

Despite its small size, the T-300 offers all of the camera controls normally found on larger housings. An interesting aspect of its design is that most of the controls are within two inches of each other, thus allowing multiple control with one hand. For example, the photographer



At present there are three lens ports available for the T-300 housing. The standard port is the smallest and works well with lenses ranging from 28 to 50 mm. The macro port is designed for lenses such as the 55 mm Micro-Nikkor. The largest of the three ports is the wide-angle and it will accept lenses from 24 to 35 mm.



The front half of the T-300 housing contains the mounted camera, lens and port. A negative image viewfinder screws into the camera's eyepiece. It allows the photographer to view the entire picture field through the rear of the housing while underwater. Rubber gear bands slip over the focus and aperture rings of the camera lens and mesh with the controls in the housing.

can operate the focus knob and change aperture settings with his/her left hand. The right hand can adjust shutter speed settings, advance film and release the shutter without changing position. The operator has almost as much control over camera functions as there would be if it were not in a housing.

A one and three-quarter inch diameter knob on the left side of the housing provides continuous focus control. The knob drives an internal gear train linked with a rubber gear fitted to the lens focusing ring. The flexible but firm rubber gear gives a smooth touch to the focus.

A one inch long aperture control lever is positioned at the upper front of the housing, less than two inches from the focus knob. The aperture scale (for the Nikon FE) ranges from f1.4 to f16, giving a total of eight separate, clearly marked f-stops. A setting for f22 is obtainable, but is not marked on the scale owing to

space limitations. As with the focus knob, the aperture control lever is linked to a rubber gear fitted onto the aperture ring of the camera lens. These rubber gears simply slip over the lens barrel so no tools are necessary.

The shutter release lever is one and one-half inches long and on the right side of the front of the housing, within two inches of the molded handgrip. It can be easily operated with either the index or third fingers of the right hand.

The film advance lever is on top of the housing, just two inches from the shutter release and handgrip. The film advance lever is two and one-half inches long and will fully advance the film to the next frame with a single stroke. The film advance lever can be operated with the right thumb while the right hand holds the molded handgrip. Incidentally, the T-300 will not accept motor drive owing to its limited space. However, manual film advance is not a bad trade-off for the housing's compactness.

The shutter speed control knob is also on top of the housing, less than one inch from the film advance. This control is a one and one-quarter inch diameter knurled knob which can be operated by the thumb of the right hand. The Nikon scale on this knob indicates 14 different shutter speeds from eight seconds to 1/1000 second. Also included on the same scale is a setting for automatic exposure and a B setting for fully opening the shutter. Other shutter speed scales are provided for different camera models.

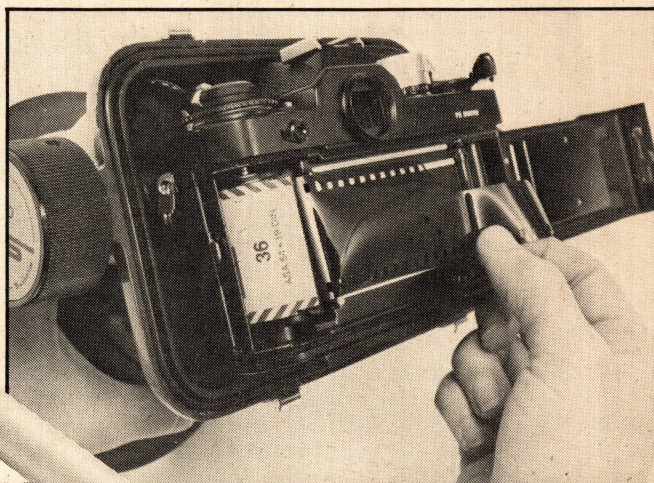
A one inch diameter view port on the back of the housing provides through-the-lens framing and focusing, as well as exposure meter readings. All of this is accomplished with a negative image optical corrector screwed into the threaded eyepiece on the camera's viewfinder. This unique device allows the diver to view the entire picture field through the rear of the housing while operating it underwater.

The T-300 is fitted with an EO bulkhead connector. The underwater flash can be quickly connected or disconnected either on the surface or underwater. Inside the housing, the EO connector is spliced to a standard PC cord that plugs into the camera.

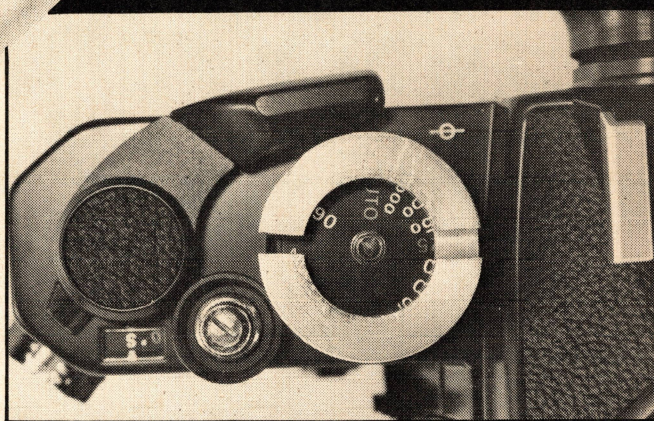
The only camera function not available with the T-300 is a view of the frame counter — there simply is no room for one.

ACCESSORY BAR

Two threaded holes (1/4x20) on the bottom of the housing allow the attachment of a flash tray or other accessories. Tussley provides a blank three-sixteenth inch thick aluminum bar which measures one and one-quarter inches wide and 18 inches long. The bar comes with three pre-drilled holes for mounting the housing and a handgrip. The photographer



Film can be easily loaded while the camera is in the housing. The housing's shutter speed knob meshes with an adapter which slips over the camera's own control. Accessory bar and EO connector allow U/W strobe use.



can custom mount any number of items onto the bar, including: light meter; a flash arm shoe mount; a bracket for an extra, fill-in flash; or a small light for night photography. The blank aluminum bar can be drilled and sawed to fit individual requirements.

PERFORMANCE

SKIN DIVER made a number of test dives with the T-300 housing, a Nikon FE camera, and all three lens ports. Photo dives were made to various depths, from just below the surface to 130 feet.

The Nikon FE camera is one of the less-expensive Nikons and yet it provides many features which are compatible with the T-300 design. The FE offers through-the-lens light metering, automatic exposure, interchangeable lenses and flash

synchronization at 1/125 second.

The camera fit into the off-the-shelf housing perfectly on the very first try. It fit precisely, with all of the screw holes and controls aligned. Installation of the rubber gears and shutter speed coupling were uncomplicated.

The first dive proved equally delightful. All of the O-ring seals worked perfectly, keeping the inside of the housing as dry as the Sahara Desert. Underwater, the T-300 is well balanced and handles with ease. Its compact design allows greater mobility and faster setups.

During our week of testing, we used the 24, 35 and 55 mm macro lenses. The photos were wire sharp and had excellent depth-of-field. The quality and optical performance of Nikon's land lenses in this housing were almost breathtaking.

CONCLUSION

The Tussey T-300 is indeed a new milestone in the evolution of underwater housing development. It is a professional piece of photographic equipment and by no means inexpensive. The basic housing, with standard lens port, retails for \$465. The wide-angle dome port is another \$125, and the macro port is an additional \$37.50. However, the housing is worth every penny of the investment, as it is capable of producing professional quality photographs.

The T-300 will be available in many pro dive stores throughout the U.S. For more information and a brochure, write to: Chet Tussey, Tussey Underwater Systems, 2200 Honolulu Avenue, Montrose, CA 91020.

The Achilles SD 14



A no-nonsense utility boat

TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Japan's technological explosion has rocked the foundations of the industrialized world. Its cars, cameras, watches, televisions and stereos dominate the marketplace because they offer sophistication, quality and value. For the past seven years, the Kohkoku Chemical Company of Tokyo has been trying to emulate its compatriots (at Toyota, Sony and Casio) by gaining a foothold in the inflatable boat market with the Achilles line. After an uncertain start, these boats have improved steadily in quality and engineering. Today they offer a viable alternative to the diver who seeks a rugged, high capacity inflatable boat at an affordable price.

Achilles sportboats come in two series, the SR and the SD. The difference is that the SD's have a removable bowdodger, while the SR's have a fixed one with a windscreen. The price difference is only \$60, so SKIN DIVER's editors decided on the cheaper SD 14 as the

subject of this article owing to the added load space provided by the open bow.

That open bow makes the SD 14 look bigger than it really is. Its basic configuration is that of a no nonsense utility boat, more likely to appeal to the serious diver than to the Sunday cruiser. The Achilles SD 14 is 14 feet long and the beam is five feet, six inches. The tube diameter is 18 inches. The SD 14 has a load capacity of six persons or 1540 pounds.

Over the past few years, Achilles has steadily upgraded its product. Since moving into a new manufacturing facility last year, its workmanship and quality control have improved to the point that the Achilles can be compared favorably to any inflatable boat.

The Achilles 14 foot models are being reintroduced in 1982 after a one year hiatus, during which the largest boats in the line were extensively redesigned. The base fabric is now a rugged 84 denier nylon. (Denier refers to the

ACHILLES SD 14	
Length	14'
Width	5'6"
Tube diameter	17.7"
Weight	191 lbs.
Capacity	1540 lbs. (6 passengers)
Recommended horsepower	30
Horsepower range	10-40
Number of chambers	4 + keel
Material	nylon/neoprene/ hypalon
Floorboards	plywood, aluminum stringers
Available colors	red or gray
Price	\$1900

weight of the fabric over an area of 1000 meters.) The nylon is sandwiched between a layer of neoprene on the inside and a calendered neoprene/hypalon combination on the outside.

Achilles' new Delrin plastic valves are easier to repair and change than the old ones were. Formerly glued in place, they are now held in by a threaded body flange and an outer ring nut. The entire

valve insert assembly can be unscrewed for quick deflation. A flap of hypalon material buttons down to protect the valve when it is not being used. The valves on the four chambers fill the pontoons, while the inflatable keel has an additional valve of its own.

The solid marine plywood floorboards now come with interlocking edge braces of aluminum, and are held in place by aluminum stringers. However, there is no fixed thrust board in the bow, which allows the delta board to flex. This could result in excessive movement of the three rectangular floorboards if the

dodger can be quickly buttoned into place. The only criticism of this arrangement concerns the material. It seems a bit flimsy compared to the heavy hypalon coated fabric of the hull.

A comfortable rubber helmsman's grip on the starboard pontoon affords the skipper security at high speeds. There is a good reason for putting it on that side. It makes the pilot reach across, into the boat, for the tiller, which is on the port side of an outboard motor. In case of a sudden swerve, the skipper is then thrown into the boat, rather than overboard. Additional grips for

fastened to the bow by molded, nylon reinforced rubber for stronger and safer towing. A self bailing valve at the base of the transom drains the bilge while the boat is running, and prevents water from entering with a one way diaphragm check valve.

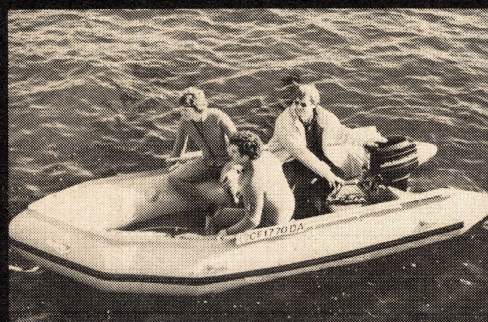
Only a few optional accessories are recommended to make the SD 14 a fine all around dive boat. The list would include a pressure gauge, a set of oars, a bow hold-all to keep personal gear dry, indoor-outdoor carpet to protect the floorboards, and a set of launching wheels.

The wheels proved their worth on our shakeout cruise in the Achilles. With the wheels in place and the motor mounted, two divers easily rolled the boat into the water at the Newport Dunes, CA launch ramp. Scott McIntosh of Port-a-Marine in Costa Mesa took the helm for the long ride through Newport Harbor at the five miles per hour limit. Once outside the jetty, he gunned the 25 horsepower Mercury outboard and the boat went up on an easy plane. Loaded with over 700 pounds of passengers and dive gear, it skipped along at around 20 miles per hour. Scott says the 25 Merc will plane the SD 14 with as much as 1000 pounds inside.

The boat handled well in turns, although the open bow allowed some spray inside. But, it's the open, utility boat design which makes this Achilles an excellent craft for diving. Personally, I didn't miss the bowdodger, because I was wearing a wetsuit and didn't mind a little spray. The boat was easy to enter and leave, even for divers without tank mounted BC's. (They had to put on the tanks in the boat and climb back on board with the tanks on their backs.)

On the other hand, the SD 14 has a few Achilles heels. The somewhat flimsy oarlocks could accidentally pull out of their holders, resulting in the loss of an oar. Additionally, the foot pump and the carrying bags could be made of a heavier material to survive the abuse divers are known to dish out. Finally, at 192 pounds, the Achilles is a bit heavy for a 14 foot boat. The solid floorboards are probably to blame. A foam core sandwiched between layers of marine plywood would be stronger and would weigh less.

In conclusion, the SD 14 is the optimum size for an inflatable dive boat. There is plenty of room for four divers, yet the boat can be carried on top of a compact van. It can be set up by two persons within 20 minutes. The fabric carries a five year factory warranty; the seams and transom are covered for one. At a list price of \$1900, the Achilles SD 14 is a rugged, no nonsense dive boat at a competitive price.



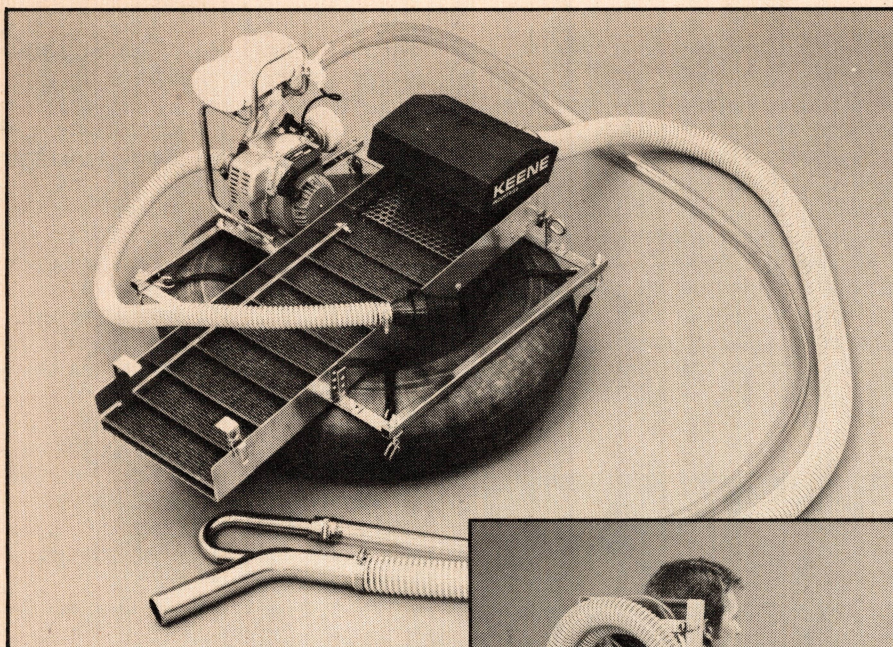
Opposite page, divers run the SD 14 down a ramp to the water using a set of launching wheels. Above, the SD 14 can get divers to those hard-to-reach sites. Left, with bowdodger removed, this inflatable has plenty of open space. The 14 foot long boat is easily moved by a 25 hp outboard.

boat is not fully inflated. The manufacturer recommends a pressure of 2.8 psi in each of the four chambers.

The removable bowdodger makes sense. It allows enough deck space for up to four divers with two tanks apiece. When launching through the surf, bow passengers can hop right aboard the large open area as the boat gets underway. Yet, when protection from the spray is needed, the bright red bow-

passengers would be a good idea for future models.

The standard equipment list is impressive for a nuts-and-bolts workboat. Four stainless steel D-rings are attached to the tubes for tying down equipment stowed inside. Four solid lifting handles are located on the outer hull for easy carrying. A black neoprene rubbing strake encircles the hull for protection. A stainless steel towing ring is



photos/Pat Brollier

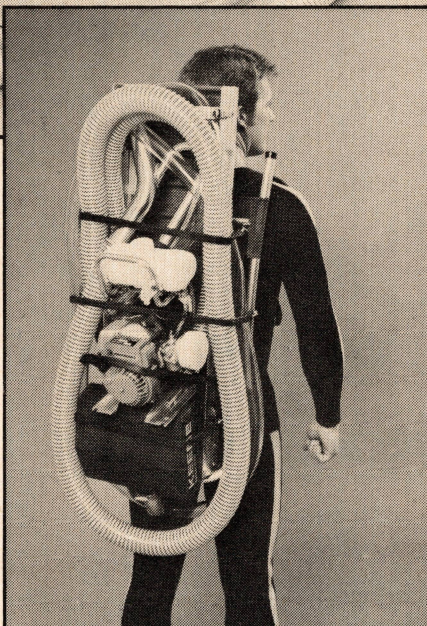
You're hiking along a mountain stream, listening to the roar of the spring runoff as it cascades down a narrow cut in the quartz walls of a small canyon. Just below the canyon the water plunges over a waterfall into a deep, quiet pool; below the pool the stream widens and slows. As you peer into the beckoning aquamarine depths a large trout darts away. You decide this is a good place to try your luck, but the fish will have to wait. You're here for gold!

In a matter of minutes you're at work sorting quickly through likely caches of sediment. You know that if this spot doesn't produce well enough, you can be off to another location in short order.

Modern, lightweight materials and advanced engineering have given today's gold hunter a tremendous advantage over the old-time prospector. The modern placer miner, using easily transported equipment, can reduce a large volume of sediment or overburden into a concentrated sample in a short period. This sample can then be panned and any gold in it recovered. The machine which makes this possible is the portable gold dredge.

Keene Engineering has been a leader in the manufacture of gold dredges for 25 years, and is the largest producer of these machines in the world today. The company has dredges in all sizes and for a variety of applications, but its most recently introduced version, the Easy Tote (model 2001), combines complete mobility (it fits a backpack) with sufficient power to satisfy the serious prospector.

The Easy Tote, like all gold dredges, is basically a combination underwater vacuum cleaner and riffle box (sluice box, sediment sorter, etc.). A jet of



The Easy Tote portable gold dredge fits on a standard backpack frame. It has a two inch diameter suction hose, a peppy two cycle engine, and weighs 38 pounds.

water, pumped by a small engine, creates a suction at the intake of a large hose, and sediment is drawn up the hose and into the riffle box with the passing water. The heavier soil and gold is trapped between the riffles (partitions). When the box is full of sediment, the collection is panned for gold.

The heart of the Easy Tote dredge, the riffle box, is made of lightweight aluminum sheeting, and is 34 inches long, ten and one-half inches wide and three inches deep. The head of the box is covered by a black marlex plastic hood which directs the water from the suction hose down and into the box.

Inside the box, sediment first falls on a cadmium coated steel grating perforated by half-inch diameter holes. The riffles, which are also made of cadmium coated steel, are joined in series like a washboard. The whole series is hinged

easy tote

pack it in-
with Keene's
latest gold dredge

Text and Photography
by Jim Walker

at the upper end and can be swung up to uncover the bottom of the box.

The bottom of the riffle box is lined with a special pad, similar to indoor-outdoor carpet, which has grooves that are perpendicular to the water flow. Small particles of gold will settle onto the pad and be trapped there.

The Easy Tote dredge is powered by a one and one-quarter horsepower, two cycle Kawasaki engine. The engine weighs only nine and one-half pounds but will drive the attached pump with enough force to push a hefty 60 gallons of water per minute — enough to move two cubic yards of sediment per hour. The engine is made of corrosion resistant aluminum and painted steel. It isn't overly noisy, having the sound of a muffled chain saw. Depending on the direction of the breeze, smoke from the engine can condense on the side of the riffle box and create a smudge. This can be wiped off with a rag at the end of the day. Three fuel mixture jets are available for the engine. Using the jet appropriate for the altitude of operation is important. A separate container is provided with the dredge for mixing two cycle oil with gasoline in the correct ratio for the engine.

The Easy Tote's pump is made of glass reinforced plastic and contains only one moving part. Its precision design and self lubrication allow it to be operated at speeds greater than 5000 rpm.

The Easy Tote has three hoses. All are made of clear vinyl and the pump intake hose and main suction hose are reinforced by helicoils of yellow plastic which strengthen them against collapse. All hose connections are secured with screw-tightened hose clamps. The pump intake hose is one and one-quarter



The Easy Tote rests on a truck inner tube. This arrangement allows it to be operated over water ranging from knee deep to eight feet. The one and one-quarter horsepower engine can drive sediment laden water over the riffles at up to 60 gallons per minute.

ter inches in diameter and four feet long. The entry to this hose has a foot valve to keep water from running back out when the pump is stopped. Sand should be kept out of the pump at all times. The intake has a cone shaped plastic strainer attached which keeps out larger pieces of gravel, but if the intake has a chance of touching the bottom (as when the dredge is used in shallow water) the intake should be placed in a bucket to keep soil out. The engine should never be run without the pump first being primed. This is accomplished by pushing the intake back and forth underwater until water is forced up to, and through the pump (visible through the hoses).

Water pushed by the pump passes through a ten foot long hose (one and one-quarter inches in diameter) which extends to the cadmium coated steel nozzle of the main suction hose. Water moving from the pump is directed out of the narrower intermediate hose and up the suction hose by a U-shaped tube on the suction nozzle. It is the force of this water being pushed up the main hose which creates the suction at the nozzle. This suction pulls water and sediment up the main hose to the sluice box. The suction hose is nine feet long. This allows the gold hunter/diver to reach depths of about eight feet. The diameter of the suction hose, two inches in the case of the Easy Tote, is the classification of the dredge (two, three, eight inches, etc.). Larger hoses are used on larger, less portable dredges. The nozzle of the suction hose has an opening slightly smaller than two inches in diameter. This helps keep out rocks which

might clog the hose. If such a clog does occur, shutting the pump down and rapping on the clog will usually loosen it. A poker rod is a handy item as well.

The engine, pump and riffle box are secured to a frame of square cadmium coated steel tubing. The height of either end of the riffle box above the frame can be quickly adjusted by means of a rod which passes through struts on either side of the box. The box rests on this rod. Each strut has three holes in it and thus three height choices. Varying the height of one end of the box changes the slope of the box and thus the speed of the water passing over it. The water speed is also controlled, naturally, by the speed of the engine. Below a minimum rpm, the water is not under enough force to climb into the riffle box. Instead, the water will flow out the nozzle of the suction hose.

The frame, with attached engine and riffle box is held together by 12 small steel bolts and nuts. The four bolts at the corners of the frame have large eyes built into them. Setup of the frame/engine/box takes only a few minutes and the only tool required is an adjustable-jawed crescent wrench. (Pliers can be used in a pinch.) A flathead screwdriver is best for adjusting the hose clamps, although pliers or the wrench will work.

The dredge and its framework rest on an inflated truck inner tube (provided with the Easy Tote). Four rubber stretch cords loop around the tube (one at each corner of the frame) and attach, by hooks, to the eyes of the corner bolts. The Easy Tote is so light that it will float even when the tube is slightly underin-

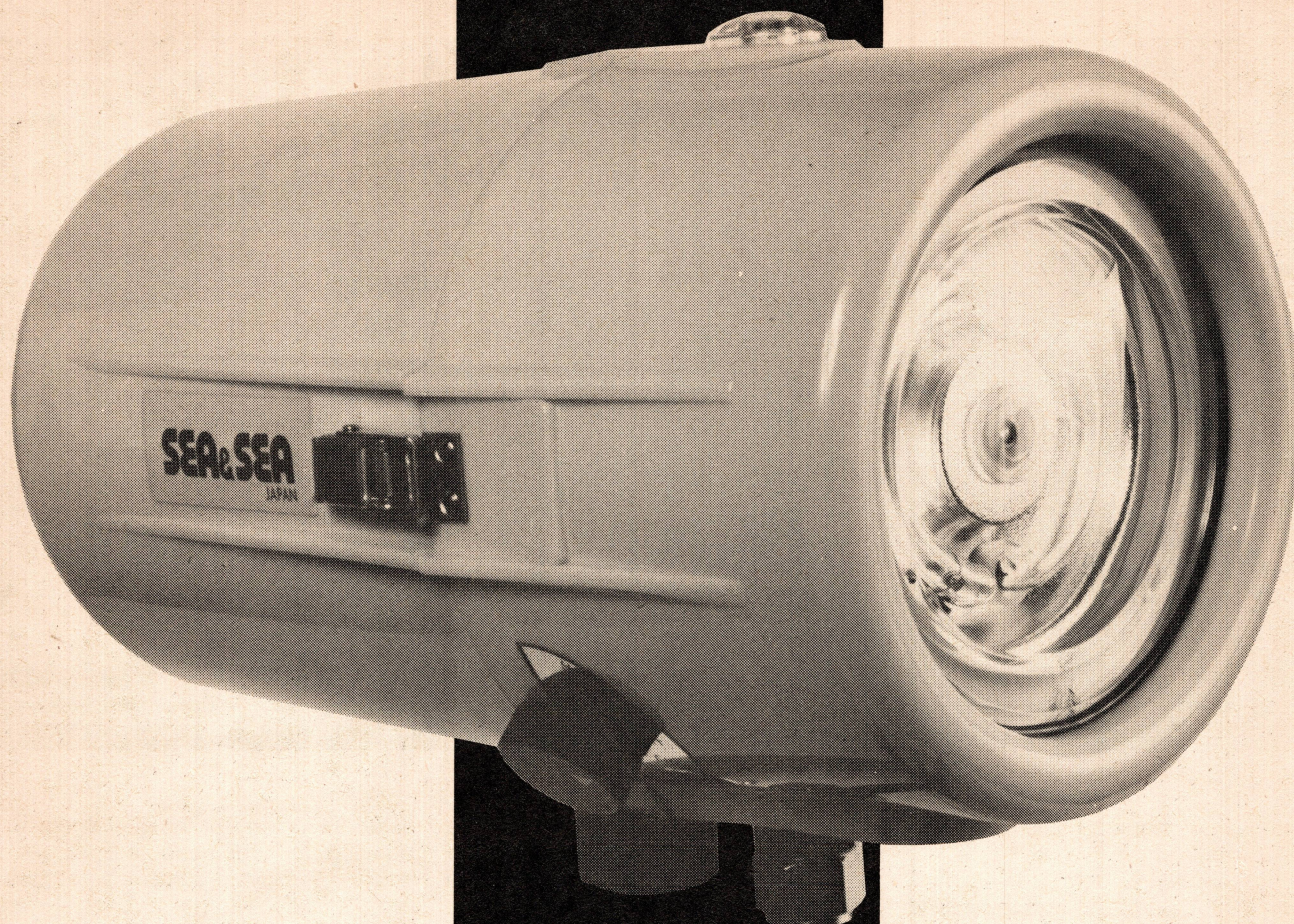
flated. However, for the stretch cords to be snug, the tube needs a good deal of inflation. A bicycle pump is a necessary item, and don't forget to bring a patch kit for the tube.

All inner tubes are not created equal. Depending on the tube and the amount of inflation, certain areas of the tube may balloon more than others. This can result in unequal support of the dredge. This differing support, and the changing weight of the water and sediment in the sluice box can cause the frame and box to tilt slightly. While this won't spill the dredge, it can cause unequal flow of the water over the riffles. A river stone, placed strategically, will balance the dredge.

When disassembled, the Easy Tote can be carried on a standard aluminum pack frame. It weighs just 38 pounds. The various parts of the dredge are strapped on the pack with the rubber cords. While the package may be longer than a standard pack, it's just as comfortable. You would, however, have to take it off in most cases, before sitting down.

The Easy Tote can be operated wherever there is sufficient water to continuously cover both the pump intake and suction nozzle. Rivers, lakes, ponds, creeks and even the ocean are fair game. Waves are off limits as the riffle box must remain steady to adequately sort out the gold. In many cases a rope anchoring the dredge to a stable object on shore is necessary. Not only does this give peace of mind, it also prevents mild currents from moving the dredge and diver off the site.

(Continued on Page 74)



One of the finest rechargeable underwater strobes to come out of Japan is the YS 150. It is manufactured by the Sea & Sea Underwater Camera Equipment Company of Saitama. YS stands for yellow sub (the strobe is canary colored) and 150 refers to the watt-second power rating of this strobe's electronic circuitry. In addition to being one of the most brightly colored strobes on the market, it is also surprisingly functional and makes underwater lighting a pleasure.

CONSTRUCTION

The exterior shell of the YS 150 is an extremely durable, corrosion-proof, injection molded plastic. It has two parts; the front half contains the flash tube, reflector and electronics. The rear half is simply bell shaped and allows the operator quick and easy access to the battery pack. The two parts are sealed by a bore-type O-ring and the rear bell is securely fastened in place by two stainless steel, spring-loaded clamps.

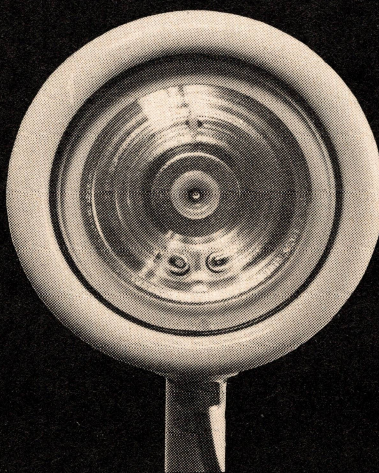
The entire strobe head (battery included) weighs approximately 4.7 pounds in air and it is slightly buoyant underwater. The addition of a flash arm, tray and Nikonos camera tend to balance out this unit perfectly. Every YS 150 is pressure tested to a depth of 350 feet prior to shipment.

Exterior features on the YS 150 include a power control knob with five positions,

YS 150

A compact, rechargeable U/W
Strobe with wide angle coverage

Text & Photography by Geri Murphy



The YS 150 strobe features a circular xenon flash tube and special reflector to produce a 100 degree angle of illumination. A Lexan dome port helps preserve this coverage.

a ready light, a coil type flash connector cord and a threaded (metric) stud for attaching the flash arm.

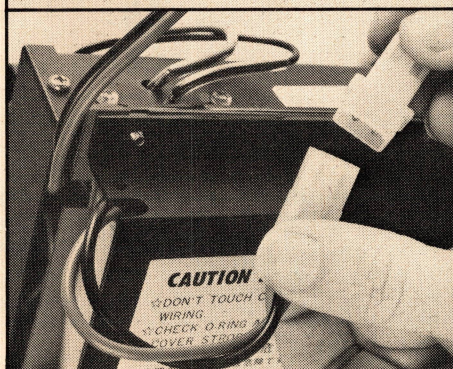
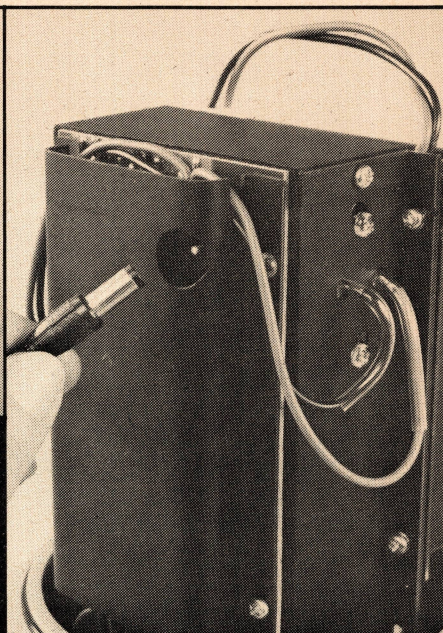
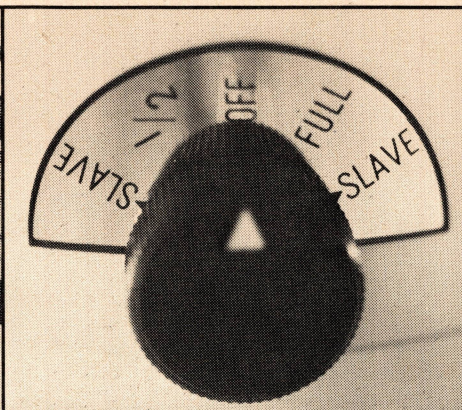
The interior of the YS 150 contains an impressive electronic package that is well built and beautifully assembled. The electronic circuit board, battery capacitors and ni-cad power pack are all shielded to avoid accidental contact or short-outs. All wires are color coded and the various electronic sub-assemblies are separated and insulated from each other.

FLASH TUBE

The YS 150 features a very unique flash tube and reflector combination. A circular xenon tube is utilized for diffused, even lighting. The flash reflector is also circular and molded to follow the contour of the tube. The unusual configuration produces a wide angle coverage of 100 degrees underwater. A Lexan dome port over the front of the reflector and tube help to preserve the full wide-angle coverage of this reflector system. Light from the YS 150 produces a circular pattern so that the strobe can be held at almost any angle. The color temperature output of this strobe is 5400° Kelvin, producing a slightly warmish light which brings out good flesh tones.

DUAL POWER

The YS-150 is a dual power strobe which allows the photographer to quickly



Upper left: The YS 150 is powered by a 7.2 volt ni-cad battery pack which can be recharged.

Above: The power switch has five settings — full power, full power slave, half power, half power slave, and off.

Left: The battery pack can be removed easily by unplugging the quick disconnect cord. The pack can then be charged while outside the strobe.

The battery pack can also be charged in the strobe by plugging the charger cord into the back.

switch for either medium distance wide-angle shots or close-up and macro photography.

The full power mode on this strobe has a 150 watt-second rating with an underwater guide number of 24 with ASA 64 film. At a distance of three feet the aperture setting would be f8. Recycle time is four seconds on the full power setting.

On the half-power mode the underwater guide number is approximately 18 with ASA 64 film. At three feet the aperture setting would be f5.6. Recycle time on the half power setting is a brief two seconds.

Both the full power and half power modes have their own individual slave settings. The slave sensor is in the center of the flash reflector.

BATTERY

The YS 150 is powered by a compact, lightweight 7.2 volt ni-cad battery pack made by the Sanyo Electric Company of Japan. It is both rechargeable and removable, allowing the operator to quickly change battery packs for additional shooting during the same day.

When the battery pack is fully charged, it will deliver 100 flashes at the full power setting or 200 flashes at the half power setting. The power pack is held in place by a simple retaining pin and can be removed by unhooking a quick-disconnect wiring coupler.

Charging time for the battery pack is 12 hours when it has been fully discharged. The battery pack can be conveniently recharged while it is in the strobe by simply plugging the charger into the back of the electronic package. A spare battery can be charged outside the strobe with the use of a small (optional) adapter wire which connects the charger cord directly to the battery pack plug.

By purchasing a spare battery pack, the photographer can keep the YS 150 flashing all day long — exposing six rolls of film, each with 36 frames (on high power).

FLASH CORD

The YS 150 can be ordered with one of three different flash cord connectors. The unit is available with either a Nikonos II or Nikonos III/IV type connector — both of which screw directly into the bottom of the camera. A third option is a special quick-disconnect cord known as the Nelson Sea Loc. The Sea Loc is similar in concept to the EO connector, but features twin, silver plated contact pins. All three flash connectors come on six foot coiled cords.

FLASH ARM

Sea & Sea has designed a special flash arm for the YS 150. It is a two part, ball joint arm, 16 inches long, with a shoe

mount at the base. The ball joint allows multi-position articulation: The arm can be tightened in any position with a large metal pressure knob. The top of the arm screws into the threaded stud at the base of the flash head, while the bottom of the arm slides onto a large shoe on the flash tray. Sea & Sea has its own metal flash tray for the Nikonos II, III and IV camera models, equipped with a handgrip, tripod screw and shoe mount.

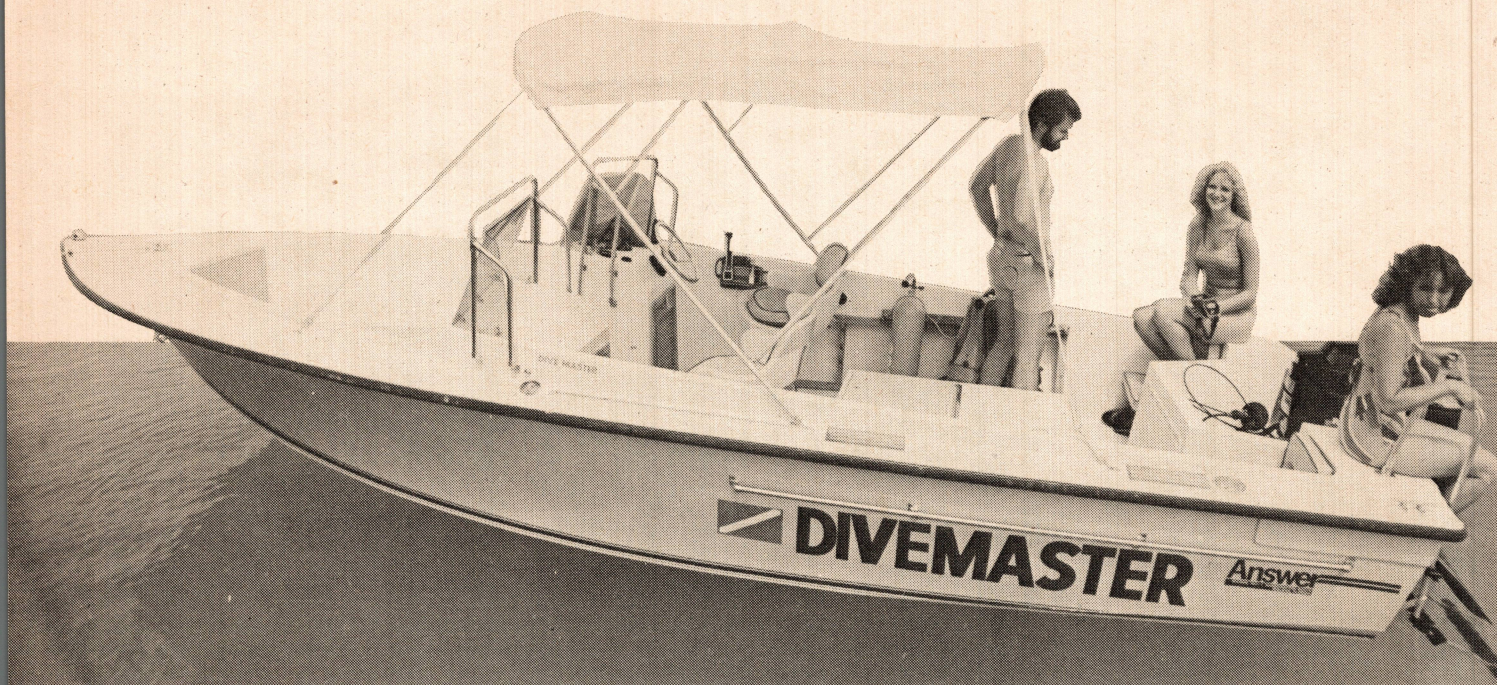
CONCLUSION

The YS 150 is a compact wide-angle strobe with many unique features. It provides more than enough light for the Nikonos 15 mm extreme wide-angle lens. As far as reliability is concerned, this strobe model has been on the market for more than six years and has established a fine record of proven performance.

The YS 150 retails for \$590. The flash arm and tray are extra. The entire Sea & Sea underwater photographic line of products is available at many pro dive stores.

For more information about the YS 150 and other Sea & Sea products, contact the U.S. distributor: Ford Scott, Sea & Sea U.S.A., 439 Mola Avenue, Ft. Lauderdale, FL 33301. In Canada you can contact Warren Buck, Sea & Sea Canada, 304-1791 Rockland Avenue, Victoria, B.C. V8S 1X1, Canada.

DIVE BOATS



DIVEMASTER

Answer Marine's 21ft.
trailerable for ocean or inland lake Text and Photography by Steve Lucas

The ad execs knew just what they were saying when they came up with this line, "Diving in the '80's, there's only one answer!" Every diver who has ever loaded gear into a small boat has asked, "Why doesn't somebody build a boat with _____!" You could fill those blanks with quite a list of wants, but Answer Marine of Hialeah, Florida, has already satisfied most of them with the 21 foot Divemaster. This boat's well-thought-out design incorporates just about everything that any diver on a day outing could possibly need.

The Divemaster is fiberglass with a modified deep V hull. It can stand up to the pounding of the ocean and carry a formidable load while literally scooting across the waves. The modified V allows for excellent stability in moderately rough seas while retaining great planing ability. Ruggedly built, the boat has one inch thick fiberglass at the keel, with an average wall thickness around the boat of five-eighths to three-quarters of an inch.

Our test model was bright yellow and equipped with a Mercury 175 hp outboard. The boat will perform very nicely with motors ranging from 115 to a maximum of 200 hp. It has a 50 gallon gas tank built in for long runs. The boat was

loaded to near maximum weight for our initial running test with seven people (one more than recommended) and a fair amount of dive gear. We were blessed with a flat, calm sea and were able to let the boat run at its maximum speed, 40 to 45 mph. The ride was absolutely free of uncomfortable vibration despite the full load. We cut through the wakes of other boats to get the feel of light chop on the ocean: The Divemaster knifed through the waves nicely. Very little spray is thrown by the boat and as a result, little or no spray came into it. Expect some spray from this type of open boat, however, in seas much over one foot. There will be less spray if you run the boat at moderate speeds.

When we reached our test destination, the variety of features built into this boat started to really come in handy. There are two 10 x 12 x 1/2 inch Lexan viewing ports in the center of the boat. By simply opening a hatch in the deck you can look at the sea floor without getting wet. The Lexan is actually stronger than the hull of the boat and the chance of breakage is virtually nil. This feature will be especially appreciated by divers with friends or spouses who do not dive, but would like to watch the action. Should you use your



The Divemaster boat is perfect for small groups of divers. It has a boarding ladder and stainless steel hand rails for those in the water.

boat for fishing as well as diving, the advantages of being able to see where and what you are fishing for are obvious.

For your comfort and the comfort of those who stay aboard while you dive, the boat is equipped with a Bimini top that offers protection from the sun. Those who want to catch a few rays can move forward to one of the two large bow seats. These same seats can be raised to allow ample storage for dive and camera gear so the deck remains uncluttered.

Just aft of the bow seats are the twin consoles, each with windshield and stainless steel grab rail. The starboard console contains all the gauges and controls for the boat's operation. The twin, deluxe helm chairs swivel, and seat the boat's operator high enough that he can safely view the path of travel. These swivel far enough around to use while fishing.

Immediately behind each helm chair is a teak tank rack. Each one holds four tanks, keeping them securely and safely in place. Immediately above and behind the tank racks are speargun and fishing rod racks. Each holds the guns and rods

securely underneath the gunnels (side rails). These features keep those potentially hazardous pieces of equipment from rolling around and being tripped over or stepped on.

In the center of the boat, directly between the tank racks is an 80 quart ice cooler which doubles as a seat for two people. Since divers usually consume lots of refreshment during dive outings this cooler will get plenty of good use. At the stern of the Divemaster are two comfortable jump seats.

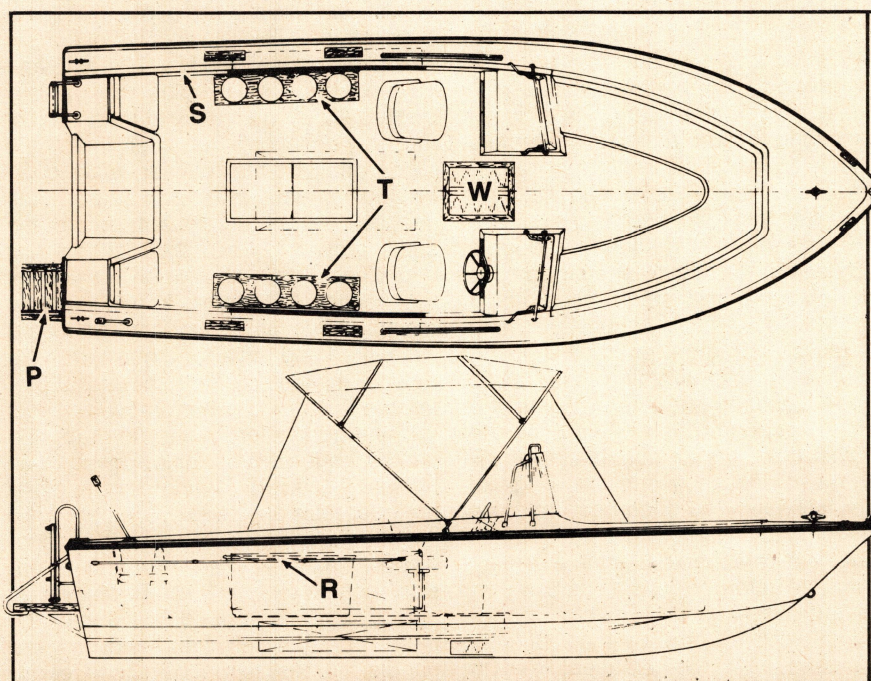
Boarding and getting into the water are made simple by the standard installation of a teak dive platform and two boarding ladders. One of the two ladders folds down far enough into the water to make it easy to climb without having to remove your tank first. However, there are two stainless steel safety rails so you can hold onto the side of the boat while waiting to board. These make it fairly simple to slip out of the tank and have someone inside the boat haul your equipment over the side. These are excellent safety features as well and will be appreciated by dive instructors and small charter oper-

ators who want to get everyone in the water before anyone descends. They also give better group control while reboarding the boat.

All these features on a trailerable boat make the Divemaster an excellent choice for the ocean or inland lake. The boat has a suggested list price of \$9170 without trailer and motor. Equipped with 175 hp motor, the price will run just over \$13,000 depending on dealer and area of the country. Answer Marine has established an excellent dealer network and the Divemaster is available nationwide. A model will be on display at the Miami Undersea Exposition June 4-5 at the Miami Springs Villas Hotel near Miami International Airport.

As the Answer Marine literature puts it, the Divemaster is, "The perfect answer for the boating family that loves to dive, fish, snorkel or just enjoy the water — on it or under it."

For further information or the name of a dealer in your part of the country contact: Don Strassel, Answer Marine, 257 W. 23rd St., Hialeah, FL 33010; (305) 887-3107. ✕



EQUIPMENT

- BATTERY I/O ONLY
- BATTERY SHELF
- BOW LIFTING ASSEMBLY
- BOW CHOCKS STAINLESS STEEL
- BILGE BLOWER I/O ONLY
- BILGE PUMP AUTOMATIC
- BIMINI TOP
- COOLER BOX HELMSMAN CHAIR
- FIRE RETARDANT FOAM FLOTATION
- FOAMED IN GAS TANK
- FUEL FILL
- GLASS REINFORCED STRINGER SYSTEM
- HAND LAYED FIBERGLASS
- HARDWARE ALL STAINLESS STEEL
- HEAVY DUTY VINYL RUB RAIL
- HATCHES, DOORS, STEP PADS, TREATED TEAK
- HEAVY DUTY CLEAT RING
- JUMP SEATS OUT BOARD
- MECHANICAL STEERING
- NON SKID DECK
- RUNNING AND ANCHOR LIGHTS
- STAINLESS STEEL TOWING EYE
- STAINLESS STEEL LIFTING EYE
- STAINLESS STEEL STEERING WHEEL
- TRANSOM LADDER
- WATERLINE TAPE

GENERAL SPECIFICATIONS

FUEL TANK IN GALLONS	50 gal.
CENTERLINE LENGTH	20' 10"
BEAM	8'

The Divemaster is 20 feet, ten inches long and eight feet wide. In addition to the equipment listed it also comes with outboard stainless safety rails (R), spear racks (S), teak swim platform (P), teak tank racks (T), and twin underwater viewing windows (W).

JBL'S COMPETITION MAGNUM

TEXT AND PHOTOGRAPHY BY MARTY SNYDERMAN



The Competition Magnum is a speargun with proven performance — it's been around for almost 20 years. Designed by Joe B. LaMonica in the early 1960's, it was produced and sold by AMF Swimaster until last year. At that time LaMonica formed his own company, JBL Enterprises, Inc., and bought the AMF Swimaster line of spearguns, knives and related items. One of the guns in the AMF line was, of course, the Competition Magnum. Often referred to by its catalog number, 4D45, it is a top quality competition gun.

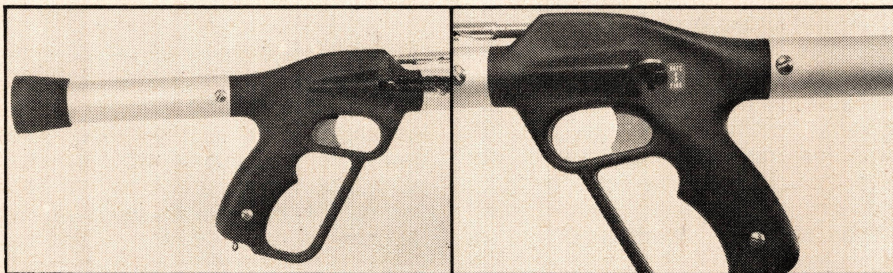
PURPOSE

The Competition Magnum is a medium-sized gun and like all well-thought-out products, it was designed with a specific purpose in mind. According to Ron Pavelka, national sales manager at JBL, that is to provide a powerful impact over a substantial range. The 4D45 possesses enough thrust to take an 80 pound white seabass at a distance of 15 feet and a fish the size of a 15 pound yellowtail nearly 25 feet away. Like all spearguns, however, the effective range is to the end of the shock line, in this case 12 feet. And, of course, the accuracy of your shot is a most important factor!

DESIGN

The 4D45 is a beautifully designed gun with a number of features that make it a superior product. It can be described as a band-powered, top-loader. This means the shaft is propelled by rubber slings. The gun has an open muzzle — it is loaded by simply laying the spear shaft on top of the barrel, rather than by sliding it through closed guides. This makes the Competition Magnum much faster to load than many other guns.

The three-eighths inch diameter shaft is 40 inches long and the length from the



The Competition Magnum has a large stainless steel trigger. The handgrip and extended stock are made of aluminum. The safety can be easily operated by the right thumb.

end of the speartip to the butt end of the extension is 56 inches. Spearguns are usually measured by the shaft length, but for travel purposes it's nice to know the overall dimensions. From the top of the handgrip to the bottom is 6.5 inches and it is beneficial to know that if the 4D45 is too long for your gear bag, the gun can be broken down so that the longest section, the barrel, is only 32 inches long. In fact, an excellent feature of the 4D45 is that the entire gun can be completely broken down and field repaired with just a screwdriver.

The speartip is a detachable, double barb design. The triangular shaped tip is made of high quality steel, called condition B stainless. The tip should last a long time unless you target practice shooting at the reef! The spearhead press fits into a short section that threads onto the shaft. If a speared fish offers even the slightest fight, the detachable point will pull free of the shaft and the wing-like barbs will flare. The spearhead remains connected to the shaft via a strong, steel cable. The detachable point is a distinct advantage in larger guns as its use prevents a trophy-winning prize from bending the shaft like a pretzel if the shot does not instantly kill it. The detachable design also keeps a bigger fish from tearing a large hole in its own body as might happen on a fixed point with a less than perfect shot.

The shaft is propelled by two black rubber slings one-half inch in diameter and 24 inches long. The black slings, as opposed to amber slings, have lamp-

black added to prolong their lives by providing ozone resistance. The slings attach to the shaft via two notches in the bottom of a correctly loaded shaft.

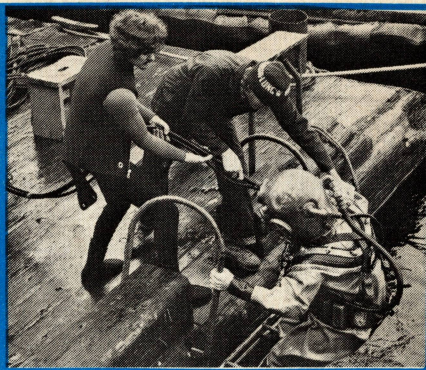
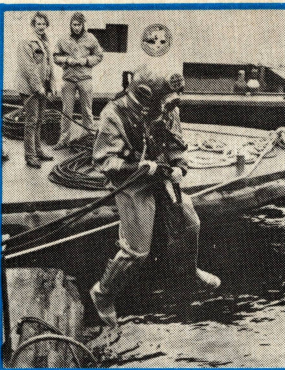
Twelve inches from the forward point of the muzzle is a piece of metal called a sling retainer. This is a somewhat controversial piece. It allows faster loading and cocking because it holds the partially cocked slings in an easy to reach, out of the way location. But after firing, the slings often hit the retainer, making an obvious noise that can alarm the intended target an instant before the shaft arrives. A rapidly reacting fish might avoid your shot when warned by the sound, but some spearfishermen maintain that all slings can be heard when fired and the added noise from the retainer makes no difference. If you prefer, the retainer can be removed.

The trigger is large, easy to grab, and can be squeezed off, as opposed to an unsteady jerk. All internal trigger parts are rust-resistant stainless steel, while the handle and muzzle are painted, anodized aluminum. The barrel and extension (butt stock) are 6061-T6 aluminum.

The safety is located just above the trigger on the left hand side of the handle. It is easy to reach and can readily be released with your right thumb if you grip the handle with your right hand. The up position prevents a pulled trigger from firing the shaft, while down prepares the shaft to be fired. The safety location is optimum because it is easy to find with your hand while keeping your eyes on

(Continued on Page 74)

MAN IN THE SEA



ARE YOU READY FOR THE CHALLENGE?

"Our destiny is linked to the fate of the oceans, and, ironically, we will determine the future of the sea through our actions in the next few decades," declares Dr. Sylvia Earle, who on September 19, 1979, walked on the sea floor, 1,250 feet below, for two and one-half hours. Dr. Earle's statement supports the continuing need for qualified commercial divers. Your entry into the world of deep sea diving will be a most prestigious and rewarding career. Well-trained divers are in demand not only in the oil industry, but also in underwater salvage, construction, farming and environmental awareness. Your first step to employment as a commercial diver is superior training.

Divers Institute of Technology (DIT) was founded by men who have successfully met the challenges of innerspace. These men know from experience what it takes to get the job done. Retired Navy and professional deep sea divers joined forces over 14 years ago to establish a commercial diving school that would train and graduate only qualified entrants to the industry. The success of the DIT program can be measured by the continual expansion and improvements to our physical location and facilities, by our accreditations, credentials and unequalled curriculum and by the over 1400 graduate divers we have supplied to major commercial diving firms throughout the world.

Divers Institute of Technology developed a six-month course that set an industry standard. Training is based on a highly sophisticated deep sea diving program that prepares you both mentally and physically to enter this new environment. DIT's curriculum has been designed to prepare you for gainful employment in all

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tion is located on the Lake Washington ship canal where water is murky and the visibility is poor; the type of environment you will be exposed to in the field. The equipment used in training is also what you will find in the field. Of the nearly 6 billion acres of continental shelf in the world, 78% has yet to be explored. Investigate DIT now . . . judge for yourself who's best qualified to train you right!

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WIDE ANGLE (Continued from Page 51)

strobe so it illuminates the subject's face.

TWIN STROBES

Two wide-beam strobes, mounted to the left and right of the camera on long arms, can be used to cover a wide-angle picture. But if one of these strobes is triggered by a slave sensor, you could have trouble. The light from the master strobe must reach the subject and reflect enough light back to the sensor so it triggers the slave. In bright, clear water, however, sunlight often overpowers the strobe light reflecting back to the sensor and the slave isn't triggered.

The location of the sensor on the slave is extremely important. For best results, it should be shielded from the bright surface above, and should be aimed so it sees the light reflecting from the subject. Sensors mounted on the top or side of the slave will be the most difficult to trigger. We prefer to have the sensor located at the front of the strobe so it will be aimed directly at the subject.

If you have trouble triggering your slave, try these techniques:

1. Angle the strobes so that the edge of the beam of the master actually strikes the sensor of the slave, but without striking the lens. This can be done when an assistant is holding the slave strobe out and away from your lens.

2. When lighting with one strobe aimed down and the other up, make sure that you aim the slave down if there is a bright surface above.

3. With an Ikelite system, use the Ikelite T connector. This eliminates the need for the slave sensor and its problems because both strobes are triggered through sync cords. We use this method with our housed Nikon and wide-angle lens and twin Ikelite Substrobes. Before devising a T connector for use with strobes of different manufacturers however, check with the manufacturers first. Sometimes one strobe will interfere with the triggering of the other.

PHOTOGRAPHER AT WORK

Photographing another U/W photographer at work — with his or her strobe flashing — can produce a picture that shows strong action. And, for best results, try the following techniques:

1. Although you may luck out with an unposed grab shot, the photographer at work should be posing for you and not trying to take pictures.

2. Make sure your subject photographer's strobe isn't too close to his or her presumed subject. If so, you run the risk of an overexposure. (Remember that the exposure is affected more by the strobe-

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Experts praised this digital wonder. Watersportsmen worldwide demanded the watch. Demand soon outstripped supply. Those few marine shops and mail-order suppliers lucky enough to get a few found their inventory gone overnight. It became almost impossible to purchase this marine time machine... at any price.

Now, 1 year later CASIO is about to introduce its newest watertight miracle... the Watersports W-300. You won't find this marine wonder in stores for months. But if you order now from ON THE RUN, you can be among the first in North America to own this beauty.

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Before CASIO introduced its Watersports watches there were no digital water-resistant timepieces. If you wanted deep-tested reliability, you had to get by with an analog watch (good old watch hands.) Simple to understand but very limited in function. And they generally cost \$200, \$300 or more. CASIO'S new W-300 has changed all that. Each has been tested to 100 meters. The O-ring construction and mineral glass crystal provide a tight seal which is impervious to water in any form... sweat, rain or total submersion. And its space-age polysulfone case and band withstands the roughest treatment the marine sportsman can give. **STOPWATCH, COUNTDOWN TIMER, THREE ALARMS AND MORE**

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Don't be fooled by the price. This underwater chronograph is probably the best as well as the most useful marine watch on the market today.

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Another advantage of this full-function timepiece is that it keeps continuous display of the time no matter what mode is being used.

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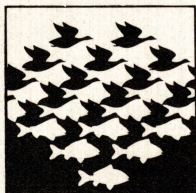
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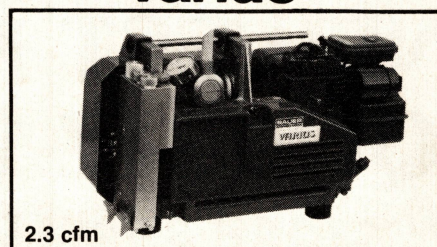
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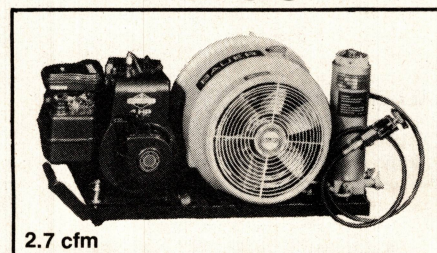
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WIDE ANGLE

to-subject distance, rather than your camera-to-subject distance.) This is a common problem because your tendency is to narrow the distance between the subject photographer and his presumed subject to tighten the composition of your picture. If the subject's slave strobe has multiple power settings, the lower setting is often the best.

3. Have the subject's slave angled so that you just partially see the reflector. If the subject's strobe is aimed toward your camera, the burst of light will form a large, overexposed area in the picture. And, the wider the beam of the slave, the greater the problem. While some U/W photographers have used this flare of light effectively, we believe that in most cases it distracts unreasonably from the main subject.

4. If both you and your subject are holding your strobes with the left hand, have your subject face from right to left in your picture. By doing so, the light from your strobe is more apt to strike the sensor of your subject's slave, and to illuminate his/her face. Be careful, however, that your subject's slave doesn't block the camera's view of the subject's head. Also, be careful that the subject's strobe isn't too close to your camera as wide-angle perspective can make it appear too large in the picture.

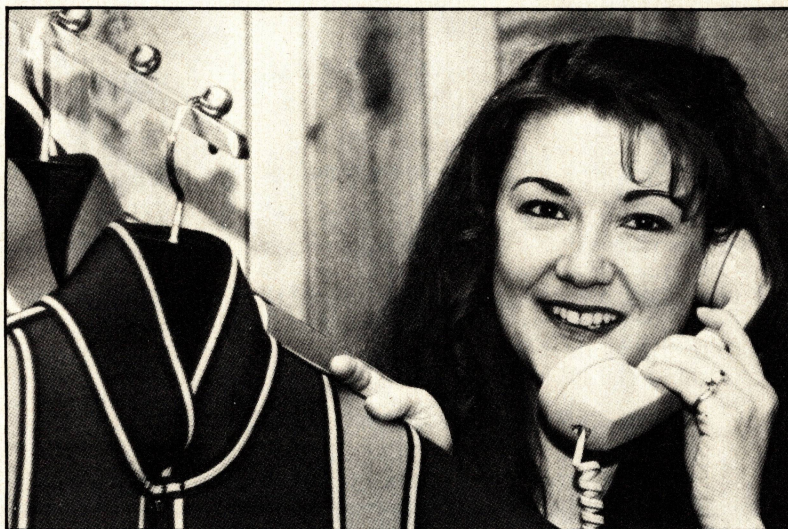
5. A normal-beam slave is often easier to photograph than a wide-beam strobe because you can show more of the strobe's reflector, but with less flare. If the slave can be set on automatic, setting it for a wider aperture than you will actually be using will reduce the light output of the slave. With an SR 2000 slave, a standard 55 mm neutral density filter can be placed over the reflector port. With the YS-50, a piece of paper or filter gel can be placed over the reflector when the strobe body is opened. And, with the Sunpak Marine 32, paper can be placed between the accessory diffuser and the reflector port. »

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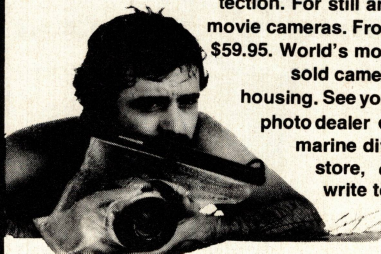


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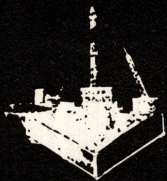
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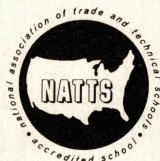
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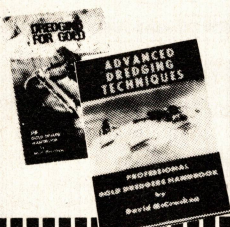
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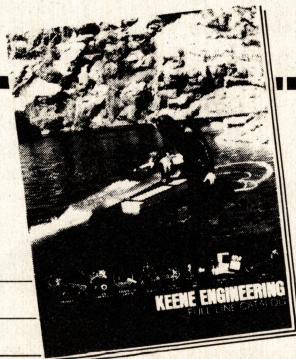


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EASY TOTE

(Continued from Page 63)

Care of the Easy Tote, in addition to that already mentioned, includes thorough rinsing in fresh water and complete drying before storage. After saltwater use, the dredge should be run for a few minutes with fresh water.

An inner tube is easily punctured, so exercise caution when setting the dredge down on anything but open water. Watch out for branches and rocks which lie just below the water's surface.

The Easy Tote portable dredge is a sturdy, functional item. Its simple design and quality materials are the reason. It's suitable for the weekend explorer or the professional gold dredger who needs a small unit to check out those remote spots. The dredge is priced at a reasonable \$399, and comes with instructions for assembly and operation, plus a spark plug wrench. Kawasaki gives a limited six month warranty on the engine and Keene gives a limited one year warranty on the rest of the machinery.

The backpack costs \$14.95. The dredge and pack and a host of other dredges, accessories, books and metal detectors are available at Keene Engineering Incorporated, 9330 Corbin, Northridge, CA 91324; telephone (213) 993-0411.

By the way, during my testing of the Easy Tote I actually found gold. It wasn't much, but that didn't matter. >

JBL MAGNUM

(Continued from Page 68)

your fish. And, it is possible to release the safety at just the last instant before firing — an excellent feature.

When the butt is placed against your hip for cocking, the extended butt stock places the notches on the shaft far enough away from your body to be visible. The stock also provides a way to steady the gun with the left hand (your non-trigger hand) when aiming.

The line release is mechanical, meaning the line and shock cord will fall free from the hook release when the trigger is pulled. Another of the Competition's well-thought-out features is that the line is held flush against the barrel before the shaft is fired. The tight fit prevents the line from getting hooked on kelp or coral. The rubber shock cord allows you to stretch the line so it will fit tightly over the hook release and it also helps prevent a big fish from tearing itself apart if it makes a run after being shot.

The JBL 4D45 retails for approximately \$120. For further information contact: JBL Enterprises Inc., 426 West Almond Ave., Orange, California 92666; (714) 633-0860. >



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DIVE RIGHT

—by R. Drew

An interview with Ralph D. Erickson, president of P.A.D.I. and training director of the I.P.I.T.C. in Chicago, Illinois.

DR: What is the most interesting or exciting diving you are going to do in 1982?

RDE: I'm taking a group of American divers for a DIVEMASTER course in Sweden. We'll dive off the western part of Sweden.

DR: Sweden? Isn't the water terribly cold?

RDE: No it isn't. It's much warmer than Lake Michigan for example.

DR: But why did you pick Sweden?

RDE: What makes it totally delightful is that the sea life is in miniature. Picture being under water with everything a lot smaller than your used to. Star fish are about 1 1/2" and cover entire walls.

DR: What is the area like that you will be diving in?

RDE: The dive area is composed of many small islands, shaped like loaves of bread. There are narrow canyons between the islands we will dive in. (that's where the star fish are)

DR: How deep will you be diving?

RDE: Our deepest dives will be to 100 feet, although some areas are much deeper than that.

DR: What is the visibility at that depth?

RDE: Visibility averages 100' for the entire area.

DR: The diving sounds great, but what will be available for non diving pleasure?

RDE: The group will spend two nights and a day in beautiful Copenhagen and four or five days in Stockholm. Included will be a special tour in the VASA ship, a man of war that went down in 1528, and was recovered intact in 1961.

DR: Who can go on this trip?

RDE: Divers should be at least PADI OPEN WATER certified. (Open water divers will receive a PADI ADVANCED OPEN WATER certification, PADI Advanced Open Water Divers would receive a DIVE-MASTER certification). Non divers can go, but would find the trip much more enjoyable if they were certified (so they can dive). This is an ideal spot for divers to take a vacation.

DR: Is the trip filled yet?

RDE: Not yet, the first fifteen to enroll will be accepted.

DR: What else should any interested person know about the trip?

RDE: We will offer some specialty courses such as Deep Diver, Night Diver, and Rescue Diver. The water is 56°. We will supply tanks and weights. The second language is English. And you know, Scandinavian women are some of the most beautiful in the world...

DR: Where can people write for information on the trip?

RDE: For details write me at THE INTERNATIONAL PADI INSTRUCTORS TRAINING CENTER (IPITC), 5036 W. 63rd St., Chicago, Illinois, 60638. (312) 767-6344.

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Under Water Hunter	19, 20
Instructor Orientation Course (I.O.C.)	26, 27
Wreck Diver	26, 27
Night Diver	29, 30

JULY:

Deep Diver (Munising, WI)	2, 3, 4
Wreck Diver (Munising, WI)	2, 3, 4
Instructor Training Course (I.T.C.)	9, 10, 11, 17, 18, 24, 25, 31, 1

Equipment Specialist	10, 11, 12
Deep Diver	17, 18
Wreck Diver	17, 18
Night Diver	20, 21
Research Diver	24, 25
Divemaster	24, 25, 25, 27, 28
Underwater Photographer	10, 11

AUGUST:

Underwater Hunter & Collector	7, 8
Buddy Diver	7, 8
Master Scuba Diver (Sweden)	9-17
Wreck Diver	14, 15
Night Diver	17, 18
Instructor Training Course	20-29
Rescue Diver	21, 22
Deep Diver	25, 26
Rescue Diver	25, 26

SEPTEMBER:

Search & Recovery	4, 5
Pre-I.T.C.	4, 5
Night Diver	7, 8
Underwater Hunter	7, 8
Wreck Diver	7, 8
Boat Diver	7, 8
Instructor Training Course	8-16
Cavern Diver (Florida)	18, 19, 20
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Deep Diver	25, 26
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Tahiti Maeva Beach Hotel \$1,299* *includes airfare from L.A.

Half way between California and Australia, OceanQuest has found the "Pearl of the Pacific" - Tahiti. Impressed by the spectacular blend of scenic beauty, climate and exotic diving, we offer this very special destination with roundtrip airfare via UTA French Airlines from Los Angeles - Sunday Departures. **Includes: five days unlimited diving, guided tours, unlimited use of motor and sailboats, windsurf boards, transfers and taxes. Optional packages to Rangiroa and Bora Bora arranged on request.**

Roatan Anthony's Key Resort \$449

Step off a century or two and dive into the world's third largest barrier reef with Peter Hughes' Anthony's Key - superb food, rooms and hospitality with tennis, horseback riding and sailboats - a great way to Dive the World. **Includes: seven nights accommodations, six days of diving, three meals daily, transfers and gratuities. Price is group rate. Individual rates on request.**

British Virgin Islands Tropic Bird \$585

OceanQuest's "Tropic Bird" is a spacious 98 ft. motor yacht with 12 double staterooms, full sized bunks, five heads, hot/ cold fresh water showers and baths, 110 volt electric service, sauna room, "Apres-Dive Pub" bar and lounge, spacious salon and dining room, aft deck, and sun decks, stereo throughout, video movies, all totally air conditioned. **Includes: seven nights of luxurious comfort, unlimited diving, night diving, island tours, all meals, taxes. Resort Course, check out dives and one week certification available.**

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Grand Cayman Spanish Cove \$535

Large sponges are Cayman's forte. Your Cayman diving will include numerous shipwrecks, reefs and underwater caves at the many fantastic dive sites. At Spanish Cove you can dive deep or shallow, snorkel or do the wall dropoff... and the photography is something else. **Includes: Seven nights accommodations. Six guided 2/tank boat trips. Unlimited beach diving May through Sept. Breakfast and dinner. All gratuities. Government tax. Transfers.**

Bonaire Flamingo Beach Hotel \$425

Enjoy famous Bonaire diving during the months of May, June, Sept & Oct at the Flamingo Beach Hotel - four or more individuals traveling qualify for this special OceanQuest rate. **Includes: seven nights accommodations, six guided reef trips with transportation, unlimited use of tank for extra dives, breakfast and dinner daily, transfers, taxes and tips. Special packages during other months also arranged.**

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Dive Travel™

By Amy Brown

Grand Cayman Spectacular diving... and accommodations.

Located in the heart of Grand Cayman's most spectacular diving area, Spanish Cove Resort is a cozy and relaxing community offering a full compliment of recreational and diving facilities. These include a fine Polynesian-style restaurant constructed of corals and natural woods, seaside freshwater pool and bar, charming thatched cabanas, and comfortable rooms. Situated on Grand Cayman's northwest shore -- 15 minutes from George Town but far enough from crowds to preserve the island atmosphere -- the hotel is managed by Peter Ribbons, who has built an established reputation on the island.

Spanish Cove was designed by divers, for divers. Only 200 yards away is the famed North Wall of Cayman, an 8-mile stretch of sheer vertical cliffs pierced by deep canyons. One of the world's finest drop-offs, the spectacular precipice starts from 60 feet and dramatically plummets to a depth of 6,000 feet. Unparalleled visibility reveals extraordinary marine life.

Directly in front of the resort, the Reef of Spanish Bay meanders parallel to shore, within swimming distance. The top of the mini wall, at 25 feet, is crowned by giant mounds of star coral teeming with schools of reef fish. A bizarre world of small creatures inhabits the face of the cliff; below, graceful spotted eagle rays wing their way over the sand. At least a dozen shallow dives are immediately accessible.

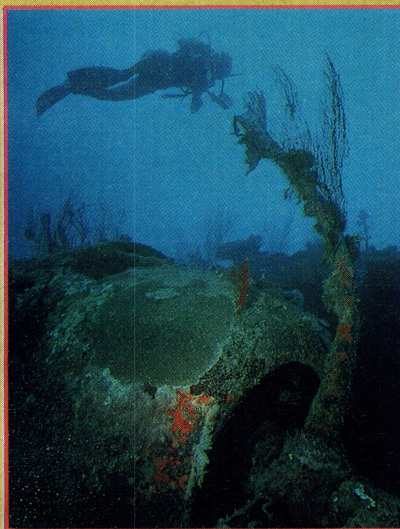
Spanish Cove's new, modern Dive Center provides every convenience. Step aboard one of the custom dive boats, which include 36-foot twin-motored flat tops, and within minutes you can be diving the reefs that have made Spanish Cove a favorite of discerning divers.

Cayman Airways and Republic Airlines provide frequent, direct service from Miami to Grand Cayman daily. For land and airline reservations contact OceanQuest, Inc., 139 Woodlawn Avenue, Upper Montclair, New Jersey 07043 or call toll free 800/526-1394 or 201/744-5254.

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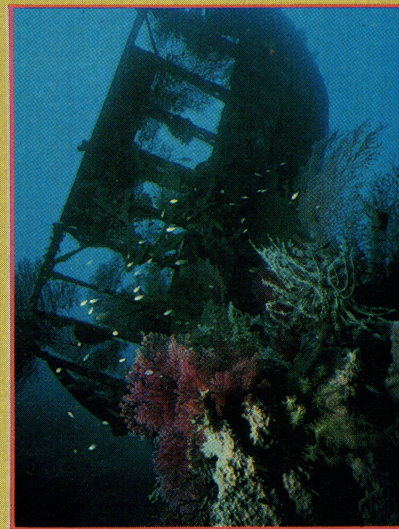
SDM travel

SECTION



NEW GUINEA'S B25 BOMBER

Text and Photography
by Bob Halstead



More than 500 ship and plane wrecks lie in the reef strewn waters of Papua New Guinea, silent testimony to battles fought during the Pacific war. With the passage of time nature has triumphed over all, transforming these war machines into majestic gardens of incredible beauty.

Papua New Guinea is a land of adventure, dramatic landscapes, primitive cultures and startling wildlife. Surrounded by the Bismark, Solomon and Coral seas in the heart of the Indo-Pacific, Papua New Guinea also boasts of waters guaranteed to make any diver's heart pound with excitement.

This vast country probably contains a greater variety of marine species than any other on our planet. Papua New Guinea is a marvel of nature, a tropical wilderness, undeveloped, unspoiled and unknown to all but a few.

Wrecks are but a small part of what Papua New Guinea has to offer the underwater adventurer,

nevertheless it rivals Truk in the variety, number and condition of its sunken ships and aircraft. Also, because of the vastness of the country and the small number of divers that have been fortunate enough to explore this underwater paradise, new discoveries are being made regularly.

Every diver dreams of reefs strewn with cannon and treasure chests. Few realize their dreams. But, one who found a treasure of another kind is Dave Pennefather who (in 1979) swam into a Mitchell B-25 bomber, virtually intact and untouched by man since it was ditched on August 5, 1943.

Marine plane wrecks which look anything like aircraft are rare because the impact with the ocean usually smashes them into thousands of pieces. But, on this occasion the Mitchell had settled on the water gently enough for it to glide to its grave, 20 meters down, with barely any damage.

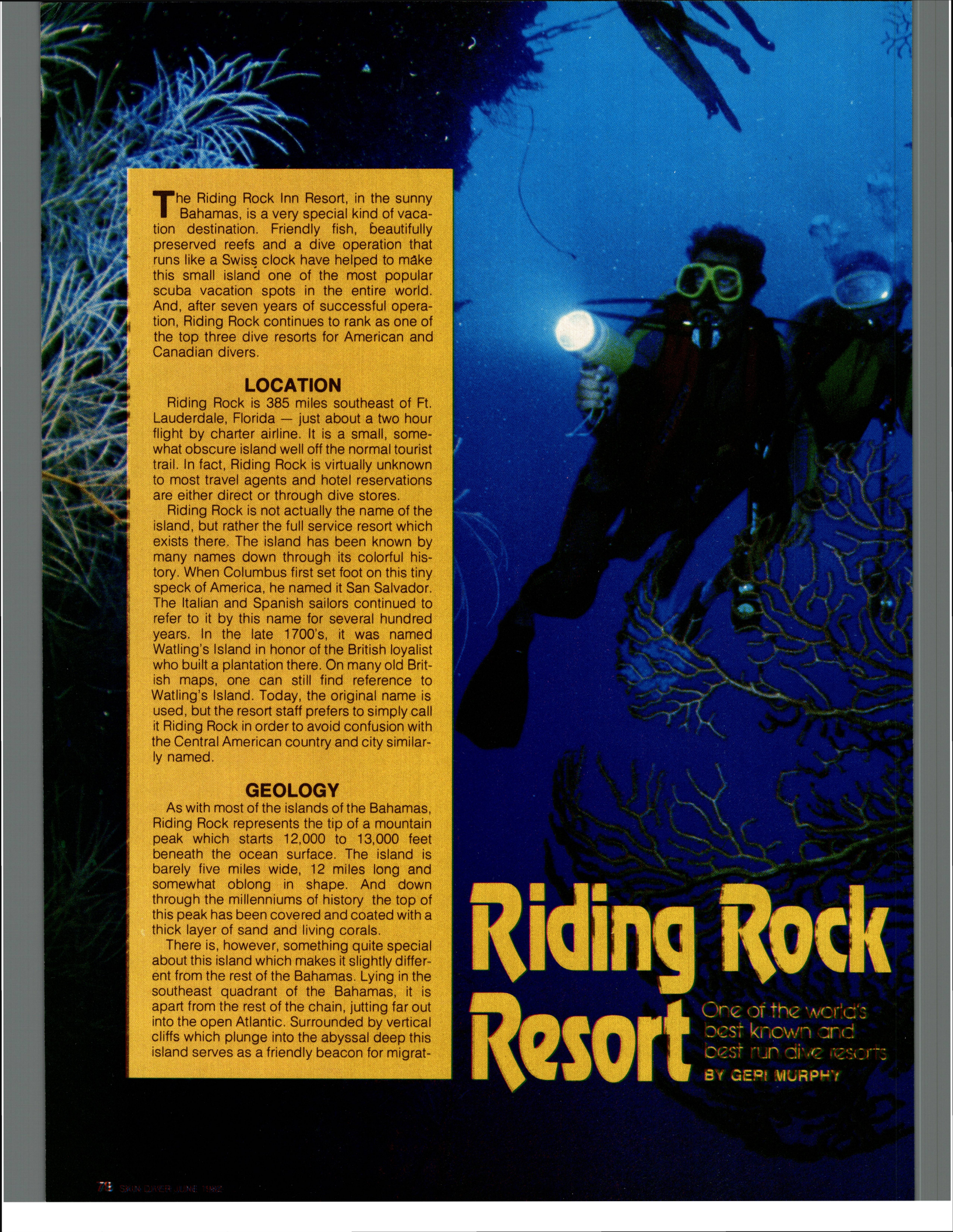
After the war many shipwrecks

were blown apart by companies eager to salvage the copper and bronze in the engines and giant propellers. When wrecks were regarded as shipping hazards they were reduced to sheets of plate iron by military disposal experts. Over the years divers have taken portholes, ships' wheels and other souvenirs so that today we rarely find virgin wrecks.

When Dave Pennefather came face to face with the magnificently preserved Mitchell he must have felt like the discoverer of pirate's treasure. His find was not by luck. An addict in endless search of information about Papua New Guinea's war-time days, Dave had been looking for the plane and had been talking to Angmai Sub of Rivo village near Madang.

According to Dave Pennefather's research at the Royal Australian Air Force historical archives in Canberra there were six crew members of the Mitchell which had the serial number

(Continued on Page 101)



The Riding Rock Inn Resort, in the sunny Bahamas, is a very special kind of vacation destination. Friendly fish, beautifully preserved reefs and a dive operation that runs like a Swiss clock have helped to make this small island one of the most popular scuba vacation spots in the entire world. And, after seven years of successful operation, Riding Rock continues to rank as one of the top three dive resorts for American and Canadian divers.

LOCATION

Riding Rock is 385 miles southeast of Ft. Lauderdale, Florida — just about a two hour flight by charter airline. It is a small, somewhat obscure island well off the normal tourist trail. In fact, Riding Rock is virtually unknown to most travel agents and hotel reservations are either direct or through dive stores.

Riding Rock is not actually the name of the island, but rather the full service resort which exists there. The island has been known by many names down through its colorful history. When Columbus first set foot on this tiny speck of America, he named it San Salvador. The Italian and Spanish sailors continued to refer to it by this name for several hundred years. In the late 1700's, it was named Watling's Island in honor of the British loyalist who built a plantation there. On many old British maps, one can still find reference to Watling's Island. Today, the original name is used, but the resort staff prefers to simply call it Riding Rock in order to avoid confusion with the Central American country and city similarly named.

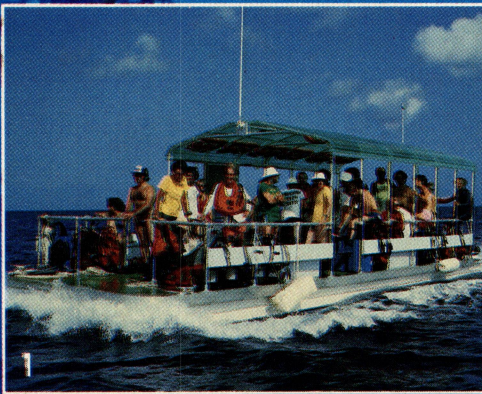
GEOLOGY

As with most of the islands of the Bahamas, Riding Rock represents the tip of a mountain peak which starts 12,000 to 13,000 feet beneath the ocean surface. The island is barely five miles wide, 12 miles long and somewhat oblong in shape. And down through the millenniums of history the top of this peak has been covered and coated with a thick layer of sand and living corals.

There is, however, something quite special about this island which makes it slightly different from the rest of the Bahamas. Lying in the southeast quadrant of the Bahamas, it is apart from the rest of the chain, jutting far out into the open Atlantic. Surrounded by vertical cliffs which plunge into the abyssal deep this island serves as a friendly beacon for migrat-

Riding Rock Resort

One of the world's
best known and
best run dive resorts
BY GERRI MURPHY



Divers explore a coral covered drop-off. Guests of the Riding Rock Inn have access to 17 miles of reefs and drop-offs.

1 Island Diver's Limited has four large flattop dive boats.

2 A diver adds her own splash of color to the undersea realm.

3 Tame reef fish are a trademark of these tropical waters.



2

4 Underwater photographers will find a variety of subjects here.

5 A Nassau grouper poses for another shot.

6 Happy divers pose for a group shot with a collection of conchs.

7 A diver takes a close look at a banded coral shrimp.



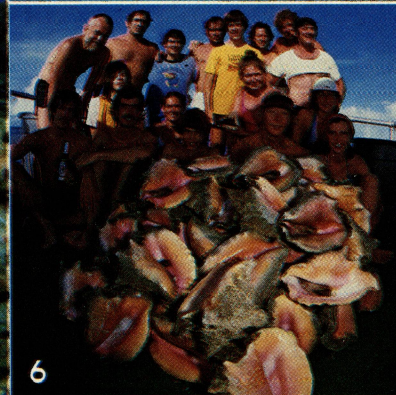
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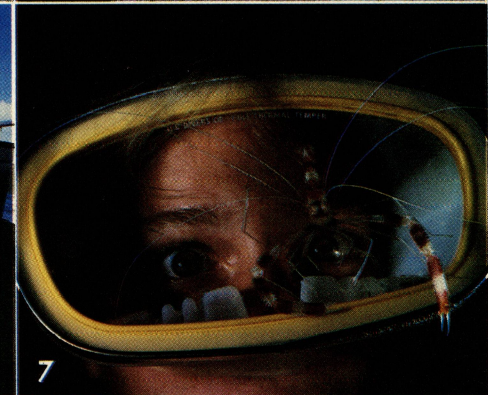
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7

ing fish. Riding Rock attracts all types of pelagic fish, including marlin, manta rays, tuna, amberjacks and others. Gentle ocean currents carry super clear water over the coral reefs and vertical walls, with underwater visibility often exceeding 200 feet.

THE PEOPLE

A visit to Riding Rock is like a trip into the rural countryside of middle America. The island population barely numbers 826. They are incredibly warm-hearted folks who genuinely enjoy visitors and are always willing to discuss the history and culture of their home. The population is divided between three settlements: Cockburn Town, Victoria Hills and United Estates. Life there is tranquil and unhurried, with plenty of time to enjoy the company of others.

THE LEGEND

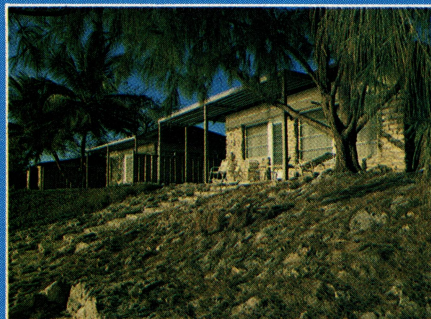
The Riding Rock Inn Resort acquired its name from a strange ocean phenomenon and obscure island legend that dates back almost 300 years. Directly out from this resort hotel is a shallow fringing coral reef which is frequently awash at low tide. Years ago, during freak winter storms, large coral boulders could be seen sliding along the top of the flat coral reef, carried by the tremendous force of the incoming surf. For hundreds of years, the islanders have called these sliding coral boulders riding rocks because they seemed to ride on the incoming surf. Originally, nearby Cockburn Town was known as Riding Rock Settlement but the name was eventually changed as a testimonial to the famous cartographer, Sir Francis Cockburn, who was appointed Governor of the Bahamas in 1840. From this old colonial legend comes the name of this modern scuba resort.

THE RESORT

The Riding Rock Resort is not just a vacation hotel, but rather a conglomerate of five different facilities that make up one of the most complete and self-sufficient operations in the Bahamas. The Riding Rock Inn is the beach hotel complete with dining room, swimming pool and cocktail lounge. The Riding Rock Marina is a small harbor which accommodates visiting yachts, sportfishing craft, dive boats and the inter-island supply boat. It provides docking space, fuel, fresh water, ice and laundry facilities. Island Diver's Limited is the dive operation at the marina. It consists of a dive shop, air fill station and fleet of dive boats. The Underwater Photo Center, next to the dive shop, provides a full range of photographic services including color film processing, camera and



Scuba tank racks.



Time-share cottages.



Buffet meal in the hotel.



The Riding Rock Inn—marina, tennis courts, cottages, pool, hotel rooms and main building.

strobe rentals, color print making and weekly underwater photo classes. The Riding Rock Oceanfront Villas is a unique condominium project next door to the hotel which offers resort timesharing for long term vacation enjoyment. Together, these five separate but inter-related entities provide the vacationing diver with just about everything under the sun.

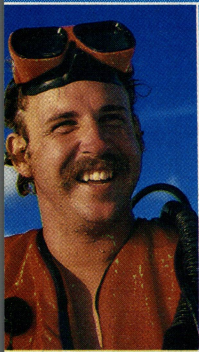
THE HOTEL

The Riding Rock Inn is a small, cozy beachfront resort. Visiting divers don't get swallowed up in a huge complex catering to hundreds of other guests. The hotel only has a total of 24 rooms which can accommodate up to 48 guests on a

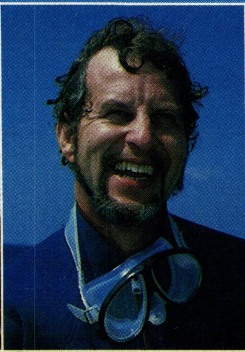
double occupancy basis. The rooms are located in two, single story buildings overlooking the ocean. Half of the rooms face the sea and the other half face the freshwater swimming pool.

There is a main building which serves as the central point for both communication and activities. This building contains a comfortable dining room, a cozy cocktail lounge, the hotel's front desk and a large veranda overlooking the ocean. It is at this main building that all three meals are served and most nightly activities occur, including the patio barbecue, limbo dance contest, and music from a live band.

The hotel is managed by Ednal Thompson, an energetic and affable



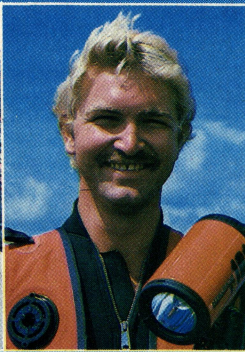
Allen Zamrok



Dick Batchelder



Ednal Thompson



Colin Tozer

ing Rock Inn as a dive resort has lead to the development of a unique condominium project which allows divers to own their "piece of the rock" at a very attractive price. Divers who have been visiting Riding Rock year-after-year have frequently ended up buying property on this lovely island. However, the cost of building a retirement home and acquiring the mortgage money for purchasing materials has slowed down the construction boom to three or four homes a year.

Instead, Riding Rock has become the focal point of an exciting condominium concept for the development of privately owned oceanfront villas and suites. The program is called Time Sharing and allows a diver to purchase one week's worth of resort accommodations for the same time period over the next 40 years. The cost of these one week property deeds ranges in price from \$2,500 to \$7,000 and the buyer receives a deed to the property.

Two years ago, the Time Sharing program was launched with the complete refurbishing of six stone cottages which were part of the original Riding Rock Inn Resort. These one and two bedroom units were completely stripped and refitted with central air conditioning, new bathroom facilities and new bedroom and kitchen facilities. The project was named the Riding Rock Oceanfront Villas. Within a period of 18 months, these six cottage units were completely sold out (mostly to divers and dive shop owners) and are now privately owned.

The management of Riding Rock has begun construction on an additional 24 oceanfront suites which will be contained in two, two story buildings adjacent to the row of seaside cottages. The resort staff has already started taking deposits on the newly planned units and it is estimated the project will be completed in 1983. For a comparatively small initial investment (at an attractive 12 percent interest rate) vacationing divers can acquire their own vacation suite for use on a yearly basis.

THE DIVE SHOP

Island Diver's Limited is perhaps one of the best equipped and smoothest running dive resort operations you will find anywhere in the Bahamas or Caribbean. The brainchild of Dick Batchelder, this facility features four large air compressors, 276 scuba tanks, a huge air storage bank and four large 34 foot flattop dive boats for twice daily trips to nearby reefs. Additional features include a scuba equipment rental department and a large storage area for drying and storing dive equipment.

The entire dive shop operation was originally designed by Dick Batchelder who formerly owned a dive shop in Michigan, led frequent resort dive trips and developed his own air compressor serv-



Pulled by a DPV, this diver glides past the open boiler on the wreck of the *Frigate*.

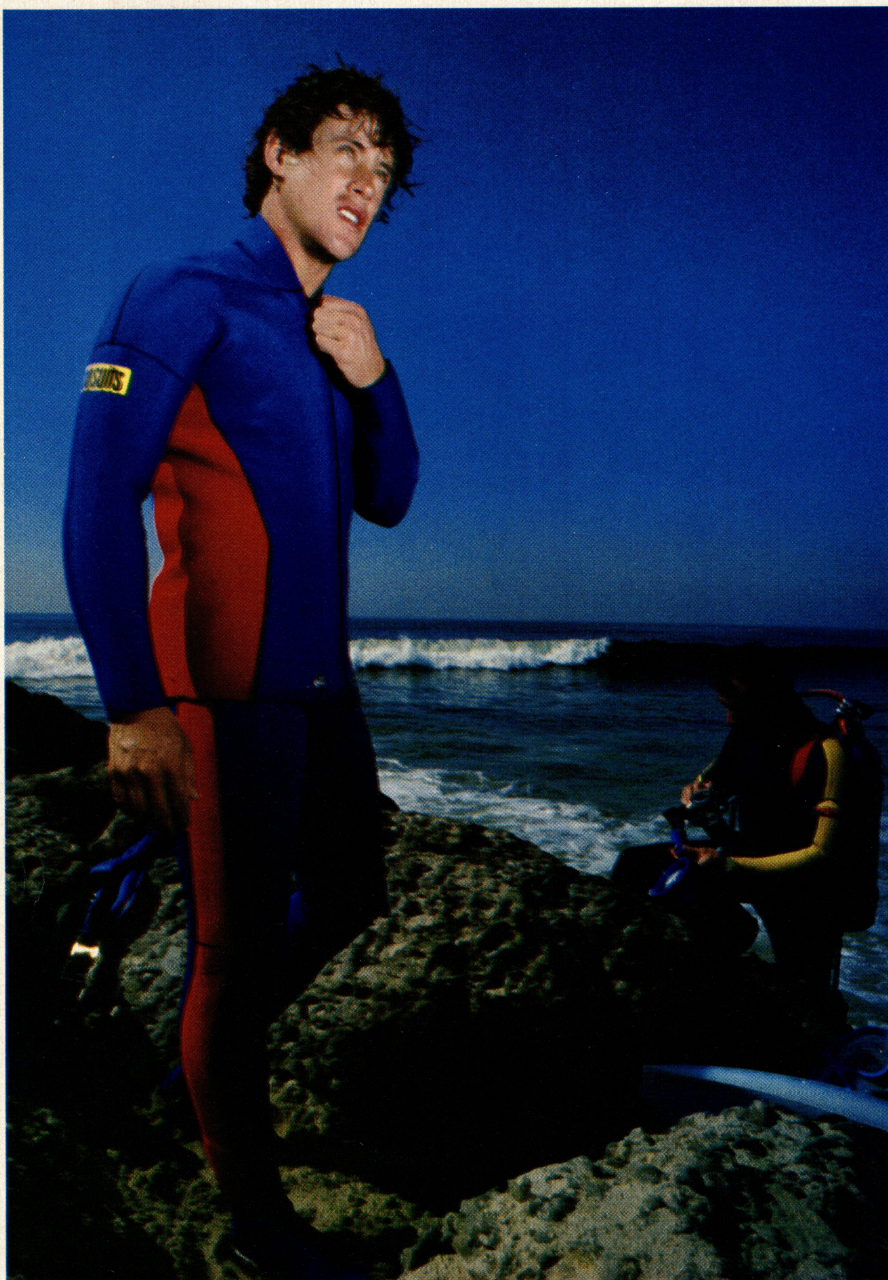
administrator. Known as Eddie to his friends and associates, this man makes every guest feel welcome and appreciated. His sparkling smile and great sense of humor help to create a very congenial hotel atmosphere. By the end of the week Eddie and his staff know every guest on a first name basis.

Although the Riding Rock Inn is geared specifically to the needs of vacationing scuba divers, this little resort offers many activities for non-divers as well. There is a tennis court for those who feel athletically inclined during the cooler hours of early morning and late afternoon. There is a cozy little sand beach for swimming and sunbathing, only a few steps from the rooms. Island tours can be arranged for

visiting the many fascinating historical sites around the island. Points of interest include one of the last kerosene operated lighthouses (built in 1866) still working in the Bahamas. This incredible device stands 163 feet high and puts out 400,000 candlepower with a visibility of 19 miles. Two new additions to the hotel activity list are sailboarding and parasailing for the more adventurous. Each Saturday afternoon, arriving guests are warmly greeted with a welcome rum punch party, complete with tasty conch fritters, free drinks and a brief orientation on how the resort operates.

TIME SHARING

The success and popularity of the Rid-



FUNCTION FOLLOWS THE FORM

The Century Dive Suit is unlike any other. It uses the finest materials like Rubatex gas blown Neoprene, YKK non-corrosive zippers, and exclusive silicone injected polyester thread, just to name a few. But what makes the

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RIDING ROCK RESORT

ice company. Batchelder has invested 20 years worth of dive shop experience in the design of this first class operation.

Everything at Island Diver's Limited has been designed with a dive guest's safety and convenience in mind. For example, the scuba tanks are stored in racks barely ten feet from the dive boats, where they can be quickly and easily loaded on and off the boats by the resort's capable staff. Arriving guests are given a full orientation just prior to their first dive on Sunday morning. Each guest is assigned to a specific dive boat at the beginning of the week and his/her scuba gear is kept on board the boat for the entire six days of diving. Guests develop a personal and friendly relationship with both the dive boat skipper and divemaster during the week of dive activities.

To accommodate underwater photographers, each dive boat is equipped with two freshwater dip tanks which can be used for washing cameras and underwater strobes. Tables have been built and placed on the boats for safely storing underwater cameras and allowing convenient changing of film. Each divemaster carries a set of tools and small parts for making minor repairs to malfunctioning regulators, submersible gauges and underwater camera equipment.

For scuba safety, each dive boat is equipped with dual air hoses and second stage regulators for safety decompression. Should a diver accidentally run out of, or run low on, air during ascent, he/she can swim to the bow of the dive boat and pick up one of the second stage regulators conveniently hanging at 20 feet. On board the boat, there are large, easy-to-read repetitive dive tables for computing surface intervals and residual nitrogen times for the second and third dives of the day. Each dive boat is also equipped with an emergency oxygen supply and a first aid kit. All of the dive boats have VHF radios for constant communication with both the dive shop and the front desk at the hotel, as well as communication between boats.

Riding Rock strives to offer the maximum amount of diving any serious diver would want to do. Three boat dives are scheduled for each and every day of the visitor's stay. The boats depart from the marina every morning at 9:30 am for a scheduled two tank dive at two different locations. The first dive is usually on a drop-off with depths ranging from 40 to 130 feet. The second dive of the morning is usually scheduled for a shallow but very interesting coral reef, underwater cave system or shipwreck. After the second dive the boat returns to the marina at approximately 12:30 pm so

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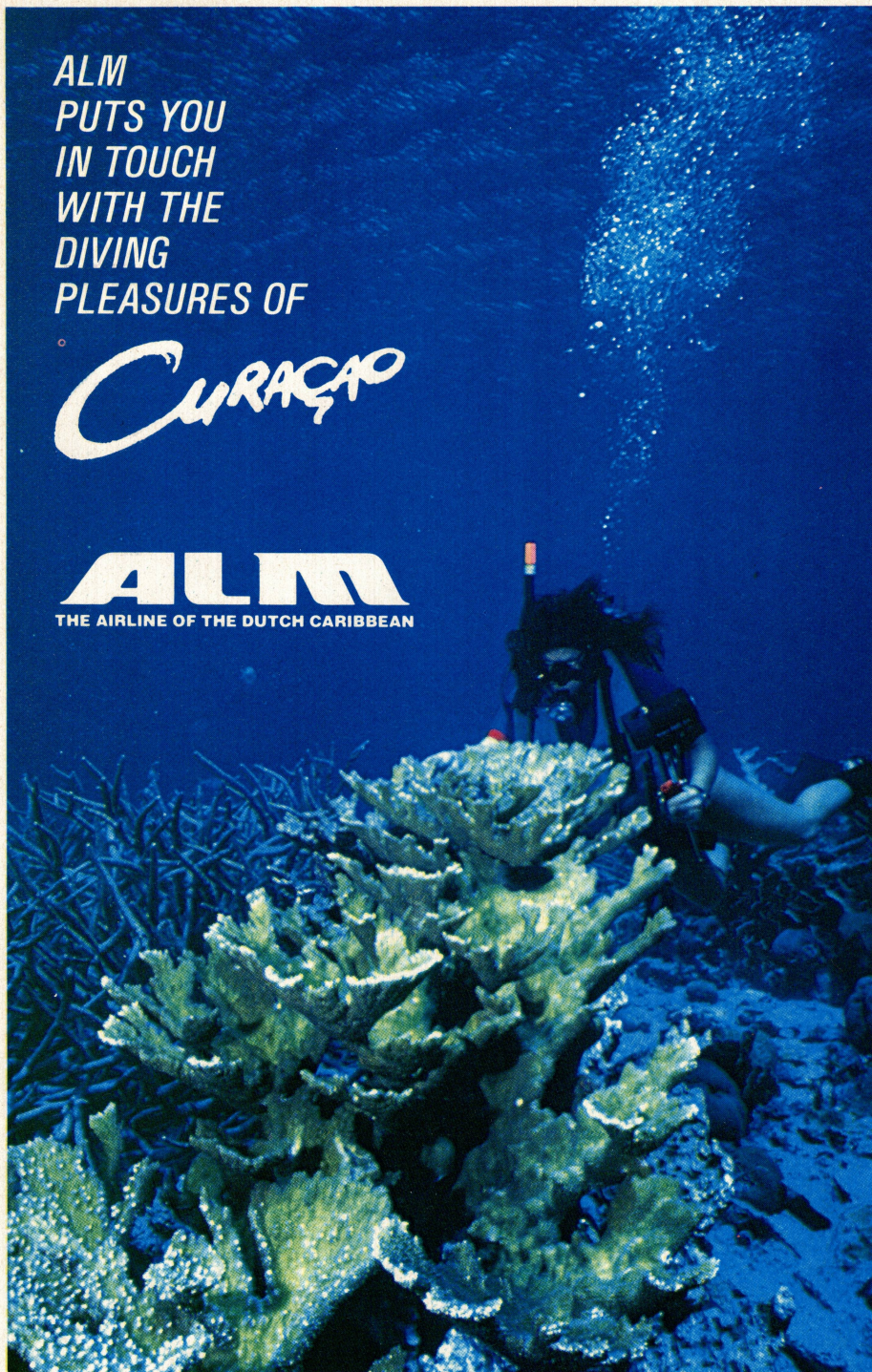
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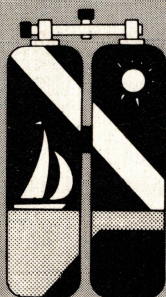
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RIDING ROCK RESORT

that guests may enjoy a quick shower and a hot lunch. The afternoon boat trip is usually scheduled for a 3:00 pm departure. This third dive is usually on the drop-off but shallower. Guests are required to compute their no decompression limits with the aid of the divemaster. The boat skipper keeps track of bottom times by logging every diver's entry and return. The boat returns from the afternoon dive at approximately 4:30 pm, just in time for a leisurely shower and cocktail before dinner.

Dives are now scheduled for just about every night of the week and the locations have been greatly expanded to include drop-offs, several shallow reefs and even a pier dive. Divers going out at night usually skip the afternoon dive in order to rest up for their nocturnal excursion.

PHOTO CENTER

Riding Rock is one of the few dive resorts to feature a full service underwater photo center. In fact, this facility is regarded as the finest in the world.

The U/W Photo Center is in a separate building next to the dive shop. It was specifically designed and constructed as a photo facility, with a built-in classroom, color film processing lab, color print department, camera rental department and central air conditioning.

The U/W Photo Center is managed by resident pro, Dave Woodward, an expert underwater photographer and divemaster with 22 years of experience. For the last two decades Woodward has taught underwater photography in a dozen different locations throughout the Bahamas, Bonaire and Grand Cayman. His photographs have been published in a dozen different magazines and books. He is an impressive lecturer and a man with infinite knowledge of marine creatures.

Woodward offers a variety of professional services for both the beginner and the expert underwater photographer. His most popular service is overnight processing (E-6) of color slide film. The exposed rolls go in by 5:30 pm and are ready for viewing at 9:00 am the next morning.

Woodward also does a big business in underwater camera rentals as well as all photographic accessories. Guests can rent Nikonos cameras, macro tubes, mini-strobes, wide-angle strobes and even a Nikonos 15 mm lens.

Woodward's pride and joy is his custom service which features high quality, nonfading Cibachrome color prints. He can produce color enlargements in a variety of sizes from 8 x 10 to impressive 16 x 20 prints. These are made directly from color slides using a very profession-

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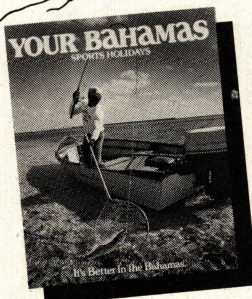
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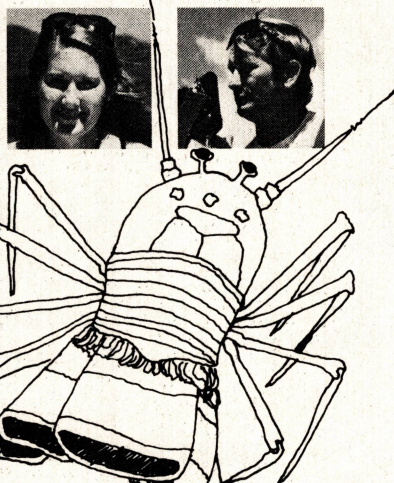
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RIDING ROCK RESORT

al process for richer tones and longer life. Woodward will make color enlargements from either the photographer's slides or his own collection.

For beginners, Woodward conducts underwater photo classes every week. On Mondays he runs a one-day introductory photo class. On Tuesdays and Wednesdays he conducts a two day basic underwater photography course. Students receive personalized instruction in camera and strobe handling, as well as a genuine appreciation for the reef creatures they photograph.

DIVE SITES

Over the past seven years, the dive-masters at Riding Rock have explored and charted more than 60 excellent dive sites. And, more are being discovered all the time. This comes as no surprise considering the fact that the island offers no less than 17 miles of superior drop-offs and coral reefs along the protected western and southern sides.

Today's lengthy list of Riding Rock dive sites can be basically divided into classic dive spots which have been known for years and new dive sites which have been discovered in the last few months. The resort has a considerable repertoire of old favorites which are almost legendary among traveling divers. These spots never seem to grow old or boring, as there is always a new fish or fascinating invertebrate which was never noticed before. **Telephone Pole** is perhaps the best known and dived spot along the drop-off. It is a very distinctive crevice which cuts through the edge of the wall at a 45 degree angle and provides a fascinating trail to the marine life below. **Snapshot Reef** is an underwater photographer's dream come true. This shallow water spot is a microcosm of reef creatures and tame fish in an area the size of a tennis court. The **Frascate** is a classic steel hulled ship which sank in 1902 and now lies in 20 feet of water close to a drop-off. It is loaded with schooling fish and fascinating artifacts. **Grouper Gulley** is one of the busiest fish feeding stations to be found anywhere in the Bahamas. On the edge of a drop-off, this 40 foot deep reef is loaded with a dozen tame groupers that will take food right out of your hand. **Shangri-la** is one of the loveliest drop-offs, complete with a vertical wall of living coral, colorful tube sponges and tame groupers.

In recent months, the divemasters have announced the discovery of several new spots which will prove particularly fascinating for divers who are returning for their second, third and fourth visits.

Sand Castles is a stunning vertical wall

(Continued on Page 116)

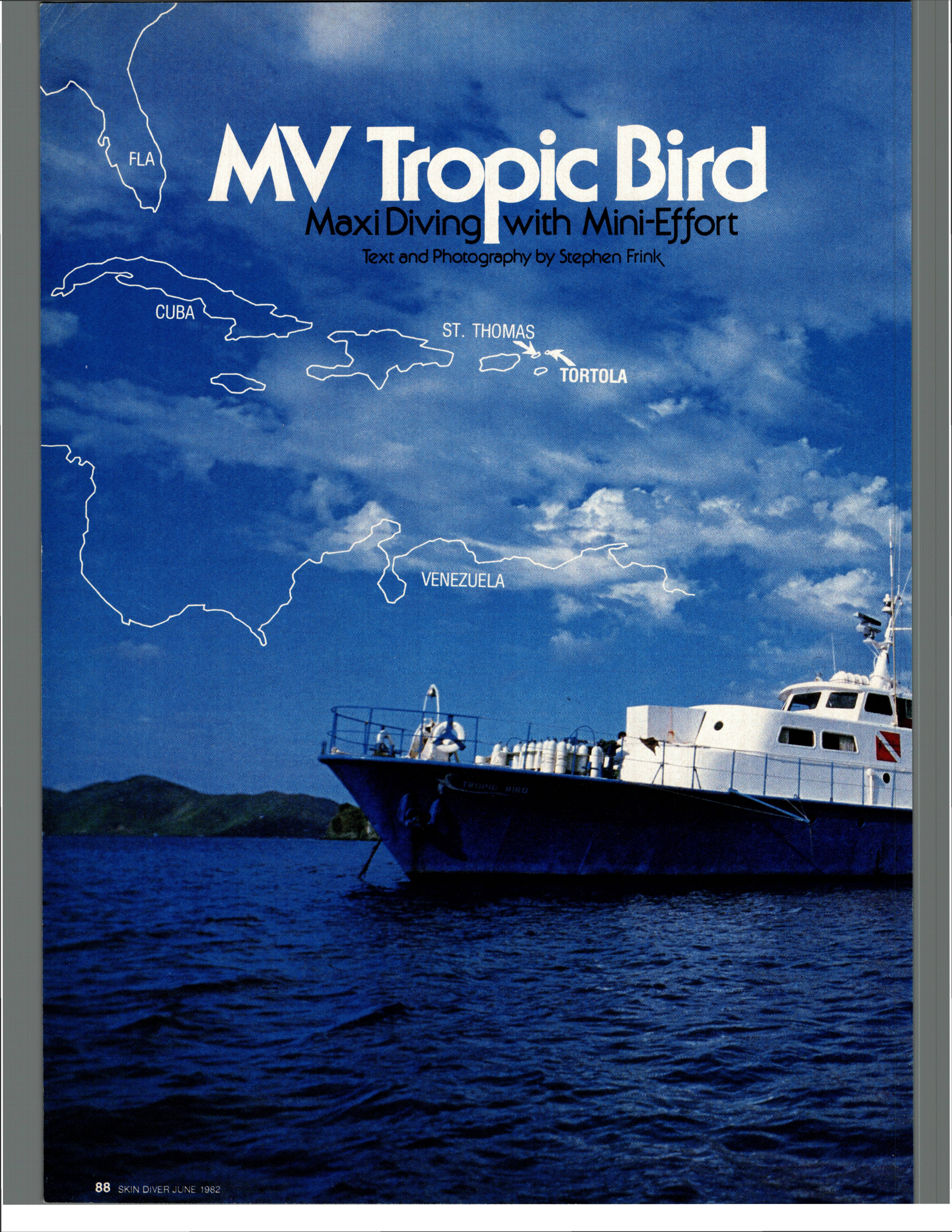


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MV Tropic Bird

Maxi Diving with Mini-Effort

Text and Photography by Stephen Frink

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Sir Francis Drake Channel has some of the finest cruising waters to be found anywhere in the Caribbean, as evidenced by the flourishing bareboat charter business being conducted out of Tortola. This is a world of secluded anchorages, gentle trade winds, clear water, an abundance of coral reefs, and one deservedly famous shipwreck. All of these combine to make the British Virgins an ideal base for a live-aboard dive boat.

Owner Phil Clarkson recognized this market and introduced the MV *Tropic Bird* to provide divers with a much wider range of dive destinations and more dives per day than is possible with a land-based operation. The *Tropic Bird* is a 98 foot floating dive resort for up to 24 divers, accommodated in double staterooms. The boat features 110 volt electricity, five conveniently located heads, freshwater showers, spacious dining and lounging areas, air-conditioning, stereo and videotape, and even a sauna.

There is a complete compressor system (along with a back-up) located above decks in the bow section for virtually unlimited air. The compressor is far enough removed from the passenger accommodations that the noise of filling tanks is not a problem, and there are enough aluminum tanks on board to make air conservation seem superfluous. The giant dive platform is hinged to sit only inches from the surface of the water making entry and exit very easy in calm seas. When seas are rougher, a giant-stride entry

is made from the side of the boat and a ladder is climbed to get back on board. We dove both ways during my stay on the *Tropic Bird* and found both to be convenient.

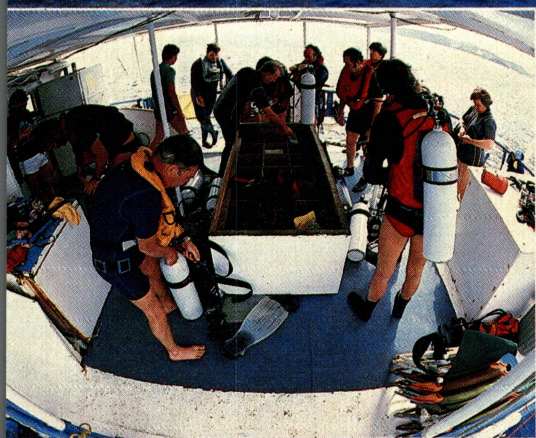
As you would expect, tanks, backpacks, weightbelts and lead, BC's, masks, snorkels and fins are available on the boat; but it is a nice surprise to note that there is no charge for the rental of this equipment. Regulators are available also but there is a rental fee for them. Film processing (E6) can be arranged by rendezvous with a boat from Underwater Safaris (on Tortola), but it should be noted that this is not practical from every dive locale on the tour. You may not be able to get every roll processed every night, but you should be able to monitor your exposures fairly regularly by subscribing to this service.

Captain Mike Bloss and the crew aboard the *Tropic Bird* seemed to consistently go out of their way to provide service for their guests. Diving is billed as unlimited. The cruise I joined was primarily chartered by a very active dive club from New England called the Gillmen — extremely pleasant people and proud of their "gorilla diver" orientation. These are cold-water wreck divers who make only one or two trips to tropical waters each year, and they were determined to squeeze in all the diving humanly possible. They were making five and six

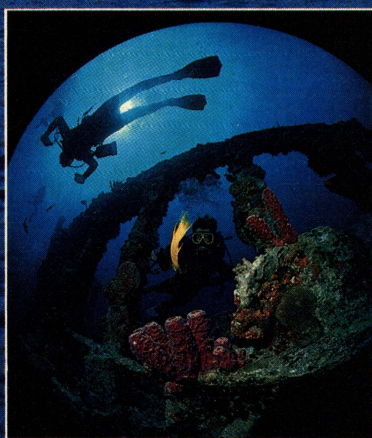
dives daily. In fact, this was the first trip I'd ever been on where I was the lightweight of the group: I averaged only four tanks per day. Some of these guys would have preferred making two or three night dives per night instead of just one, so for them, perhaps, the diving was not "unlimited."

This question of number of dives per day brings up an interesting concept relative to the *Tropic Bird*. The Gillmen were avid divers and preferred to find one anchorage each day and dive it heavily. Another group might prefer spending more time at sea and visiting more of the islands. Another group might want to arrange land excursions in the inflatable boats to sightsee and shop. The point is that the customers aboard the *Tropic Bird* are the primary policy-makers and each charter may be customized as interests dictate. The crew will make suggestions, and if a given proposal is impractical for some reason, they will impose their veto power. But the basic flavor of the cruise will be determined by the participants.

Even though Sir Francis Drake Channel has a nickname, "The Pond," that suggests a placid nature, winter in the Caribbean can bring some rough seas. The seas arose during my



Guests gear up for a dive from the *Tropic Bird*. Above, the *Tropic Bird* at anchor in the BVI.



Divers explore the wreck of the *Rhone*.



Sponges grow in profusion on the *Rhone*.

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Paul Tzimoulis, Editor, Skin Diver Magazine

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TROPIC BIRD

stay on the *Tropic Bird* and I was quite impressed with the way she handled them. There were numerous places to get out of the wind and into a lee, so the rough waters were a nuisance only in that we had less than optimal visibility and that some prime areas were undivable.

The premier dive spot of the area has to be the wreck of the *Rhone*, and this was accessible to us even in marginal weather. Driven onto the rocks at Salt Island by a hurricane in 1867, the RMS *Rhone* has become one of the most popular wreck dives in the Caribbean owing partially to the exposure generated by the movie *The Deep*, but mostly because it really is a very special dive.

The *Rhone* sits in three major sections on the ocean floor. The bow section is probably the most dramatic because the general shape of the ship is best preserved in this section. As you descend the anchor line the general configuration of a massive ship lying on her side begins to emerge. The foremast and crow's nest are visible from a distance, as are the bowsprit, hatches and ribs. Closer inspection reveals her true beauty. Schooling fish swarm within the artificial reef generated by the bow section. Masses of yellow cup corals encrust vast sections of the interior. Colorful sponges grow in profusion throughout the hull. From wide-angle, through fish, through macro subjects, the bow section is literally thick with photographic potential. The only problem is that she sits in 80 feet of water and bottom time is somewhat limited.

After a reasonable surface interval, additional dives can be made on the mid-section and the stern. These areas have their own personality. The mid-section rests in 60 to 70 feet of water and is distinguished by some beautiful encrustation on the exposed ribs, a huge winch, and a massive set of open end wrenches welded to the deck by electrolysis. The stern sits in approximately 30 feet of water and features much recognizable superstructure as well as the rudder and propeller. The real beauty of the stern section for me is the sheer quantity of tropical fish to be found there. These fish have been hand fed by divemasters for years and see divers on a daily basis. Consequently, they are easy to approach and photograph. Whole magazine articles and books have been devoted to the *Rhone*, so I can't hope to fully describe it here. But it was a highlight of our trip and we made nine dives on the wreck in two days.

Conditions will determine which of the myriad other dive sites will be visited during the eight day package aboard the



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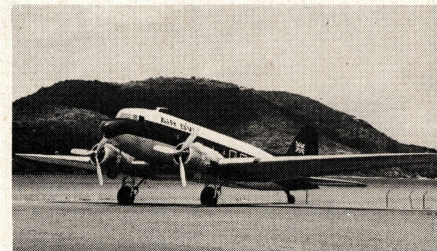
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TROPIC BIRD

Tropic Bird. Two dives which were unavailable to us owing to weather had been very highly recommended to me by friends who had been there. The Indians are a series of rocks sticking out of the water off Norman Island and apparently provide a very nice drop-off from 40 to 80 feet, abundant marine life, and generally good visibility. The Baths are a concentration of massive granite boulders at Virgin Gorda which provide fascinating topography both above and below the



Air BVI flies from Puerto Rico to the island of Tortola several times daily.

surface of the water. There are caverns with masses of schooling glass minnows, interesting coral structures, gorgonians and respectable concentrations of tropical fish. At least that's what they tell us.

Among the dive sites we were able to visit are the following:

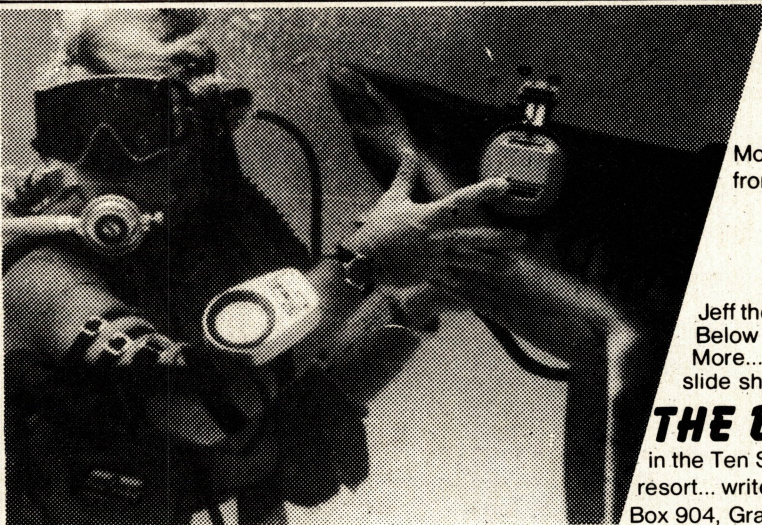
The Bight — Located at the Northwest end of Norman Island, this shelf of coral extends to the sand bottom at 60 feet. Here we saw eagle rays, schooling Atlantic spadefish, black coral at 40 feet, juvenile tropicals and the huge feather-duster worms that characterize so many of the shallow reefs in the BVI's.

Little Harbor — A beautiful anchorage with lush, green island all around. Our diving was only fair. We took the inflatables to shore, did a little snorkeling and generally relaxed at this spot.

Ginger Island — We dove the south side of Ginger Island which normally is exposed to the prevailing winds. Since we were in the unusual situation of experiencing the wind from the north, this provided us a lee. There are excellent stands of star coral in 40-50 feet, but not a great deal of encrusting sponge or soft corals. We made a night dive on the same reef and saw numerous lobster and several very large pufferfish.

Vanishing Rocks — This is one of the finest shallow reefs I've seen in the BVI's. There was lots of very healthy pillar coral and coral ledges full of tropical fish, including schools of reef butterflyfish as well as concentrations of squirrelfish and bigeyes. Again, there is lots of photographic potential in this area and this is one dive I would like to do again some day.

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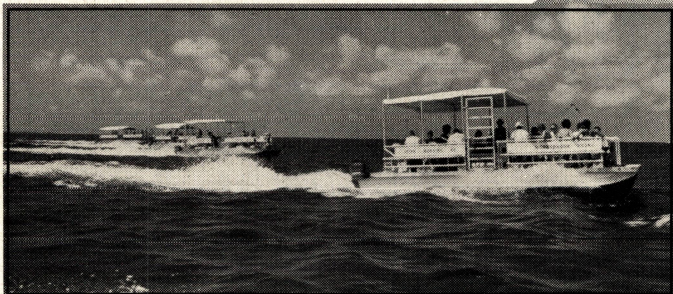
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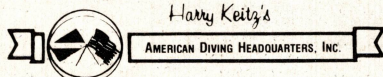
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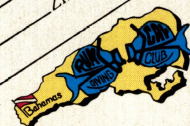
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One of the best surprises in the Caribbean for the traveling diver is the Dutch island of Curacao (Cure-a-sow). Known primarily for its storybook architecture and spectacular shopping, its stunning underwater attractions are just now beginning to be appreciated on the international dive scene.

The six Dutch islands in the Caribbean, also known as the Netherlands Antilles, make up one of the most varied, cosmopolitan, surprising and fascinating conglomerates in the area. Geographically they are divided into two separate clusters of three islands each: The Dutch Windwards (the three S's) of St. Maarten, St. Eustatius (Statia), and Saba are volcanic islands located east of the Virgin Islands. The Dutch Leewards (the ABC's) of Aruba, Bonaire, and Curacao are coral and limestone islands located a few miles off the coast of Venezuela. The ABC's are so far south that they are out of the reach of the northern cold fronts and out of the hurricane zone. The weather is so stable and predictable that no daily weather report is given in local newspapers.

Having consistently good weather and magnificent underwater environment does not, however, ensure an island's place in sport diving's hall of fame. It is probably because of Bonaire that Curacao is not as well known as a dive destination. Bonaire's greater development in dive operations and more natural protection from the trade winds have simply overshadowed Curacao's underwater attractions. But Curacao, and for that matter Aruba, have a dive environment that is in the top 20 percent of the Caribbean.

Most of Curacao's dive sites lie along the protected southern coast a very short distance from shore. Although it is usually more convenient to dive from a boat, over half of the 35 to 40 known dive sites can be reached from the shoreline; you can enter the water from sand beaches, gravel beds, or small piers along protected bays. The most interesting coral formations are found from shallow water to depths of 80 to 100 feet. As in Bonaire, there is a lot of fringing coral within a stone's throw of the shoreline, although there are no extensive fields of elkhorn hugging the shore. Visibility is usually 80 to 150 feet even close to the entrance to Willemstad Harbor and St. Anna Bay, one of the busiest ports in the world. There is a wonderful array of fish and invertebrate life along the reefs and drop-offs. In fact, Curacao offers several underwater attractions and some splendid shipwrecks which are uniquely its own.

A good place to start the underwater discovery of Curacao is at Blau (Blue) Bay drop-off a short distance west of the Hilton Hotel. This is an excellent wall dive with several notched plateaus

along the way (a result of the changing level of the sea during the last great ice age). The best entry here is from a dive boat which can be anchored in the lee of a high bluff and directly over the drop-off. The shallow reef is inside the drop-off and just beneath the limestone cliffs that surround the bay. This site is less protected from the trade winds than some of the others and the wave action and surge throw huge purple seafans to and fro in the shallows. The first plateau with its associated ledge and cavern system is found at a depth of only 15 feet. On the underside of the ledges and overhangs is a kaleidoscope of color; the bright oranges, reds and yellows of encrusting sponges, delicate hydrozoans and splendid cup corals.

The wall is quite sheer, almost verti-

cal in spots, and all of the attractions of drop-off diving abound including yellow and purple tube sponges, layered corals and some huge black coral trees. Meandering through the natural forest are schools of yellowtail snapper, creole wrasse and blue chromis. Silvery barracuda, large African pompano and tiger grouper are not uncommon. Here, as throughout the ABC's, shark sightings by divers are rare.

Vaersenbai is one of the most enchanting dive spots along the leeward coast. Six miles west of the beach hotels and only 60 yards offshore this small, secluded cove is a lovely coral garden of isolated heads on a white sand bottom in 20 feet of water. The bottom is literally carpeted with green and purple-tipped sea anemones. The visibility is generally

Curacao!

Diver's Delight With A Dutch Touch

TEXT AND PHOTOGRAPHY
BY RICK FREHSEE



80 feet or better and it is possible to sit on the sand bottom in one area and count more than 30 anemones in a single view. Some of the anemones are more than two feet in diameter and practically every one harbors at least one or two commensal crabs or glassy shrimps. Look closely for a smaller species of anemone with a brilliant orange underside. It is perfect for macrotube photography. There is also a remarkable number and variety of plume, featherduster, Christmas tree, and other tube worms attached to small stony corals.

On the seaward side of the reef there is a 45 to 60 degree slope to a depth of 150 feet — a dazzling display of shapes and colors with layered star corals, slender seaweeds, spiraling wire coral and many long, purple tube sponges and huge, orange pillow sponges. The slope is animated with flitting angelfish, blue tangs, parrotfish, grunts and groupers. Some of the most notable reef fish are the black surgeon, the royal gramma and the lizardfish.



The quaint architecture of Willemstad.



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Perhaps the most impressive dive site, and one that is special to Curacao, is a dramatic shipwreck that lies outside the mouth of Willemstad Harbor and St. Anna Bay just east of the Holiday Beach Hotel. The *Superior Producer* is a 200 foot steel-hulled island freighter which sank in a relatively heavy sea in October 1977. The ship was headed from Curacao to Venezuela with a cargo of Christmas merchandise including clothing, luggage, wallets, perfume and liquor, when she listed slowly to starboard, took on water and sank a short distance out of port. For weeks local boaters picked up merchandise that floated to the surface, although the Dutch Coast Guard posted a ship over the main wreck to prevent any major unauthorized salvage.

Today the *Superior Producer* is a stunning sight to behold as the visibility in the area is normally excellent. On four different dives we had no less than 125 feet of visibility on the wreck. On occasion it is possible to see the wreck from bow to stern in a single view. The ship is sitting absolutely upright in 100 feet of water on a flat, sandy bottom at the base of a coral slope. The hull is completely intact and the main mast, complete with rigging and crossbeams, rises straight up to within 25 feet of the surface. A forward masthead is broken at the base and hangs out over the rail at the starboard bow. Although not yet covered with growth, there are small corals and sponges decorating the masts, the decks and the railings, and a few small black coral shrubs are growing from the hull. All of the ship's cargo holds, hatches, companionways and quarters are open for exploration and there are hundreds of broken whiskey bottles scattered across the stern deck. The only minor disappointment is the missing propeller and shaft on the outside of the hull. The *Producer* is Curacao's must see dive site and a shipwreck that rates visually with the best in the Caribbean.

Other interesting dive sites that are standard fare for visiting divers include an artificial reef known as Bus Stop which is made up of 100 junk cars and several old buses, and the wreck of a small tugboat in shallow water that makes an excellent night dive. For the dozens of known dive sites there are 100 new ones to explore all along the calmer southwestern coast. Curacao has plenty of underwater appeal and a handful of savvy operators who can introduce you to the sights.

It should be noted, however, that while the equipment and services available are safe and adequate, diving operations in Curacao cannot yet be compared to

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neighboring Bonaire. A little patience is a small price to pay for new adventure and personal discovery.

The greatest topside attractions in Curacao are the five square blocks of duty free shops in Willemstad on the east side of the channel entrance to St. Anna Bay. Within this space, known as the Punda, all the world's great bounty is available at bargain prices. There are cashmere sweaters from Scotland; Madeira linens; Wedgewood china; handbags from Argentina, England, Spain and Italy; French and Italian sport coats and slacks; Hummel figurines; delicate crystals; Dior dresses; skirts from Guatemala; imported perfumes; and all makes of watches, jewelry, leather goods, cameras and stereo equipment.

In addition to being one of the most tantalizing shopping centers in the world, it is also one of the prettiest with multi-gabled, multi-colored narrow buildings — the old Amsterdam of the Caribbean. As the story goes, an early magistrate complained that whitewashed houses hurt his eyes in the bright sun and a proclamation was issued to paint the city in rainbow colors — probably a tall tale at best, but as good an explanation as you're likely to find.

To get from the Punda side of Willemstad to the Otrabanda (literally the other side), you walk across the unusual Queen Emma pontoon bridge. Be a tourist for a short while and watch it open to allow a cruise ship or freighter to enter the harbor. It swings open from the Otrabanda end dozens of times a day at the sound of a siren. There is a new bridge above the harbor which has diverted much of the automobile traffic from the shopping area.

It is somewhat sad that the shopping and dining in Willemstad command so much attention, for the rest of Curacao has its own very special flavor. Almost as soon as you leave the city you're in a strange and barren desert-dry countryside known as the Cunucu. It is a rugged, challenging landscape of three-pronged cactus, spiny-leaved aloes, poinciana and the unusual divi-divi trees bent into grotesque shapes by the prevailing trade winds. Every few miles or so you will come upon brightly colored houses with sloping roofs and walled terraces on the top of a hill. These plantation houses, the Caribbean equivalent to the manor houses of Europe, have been restored and converted into private homes, museums or restaurants. A plantation house that I explored between Santa Cruz and West Bay had the dates 1630-1939 sculptured above the main door.

The Cunucu rises in the northwest near Mount St. Christofel at 1215 feet, and runs down to the sea in limestone and coral cliffs interspersed with bays and beaches. Curacao is not surrounded with great beaches but there are some beauties along this western end of the island. These include Santa Cruz Bay with its



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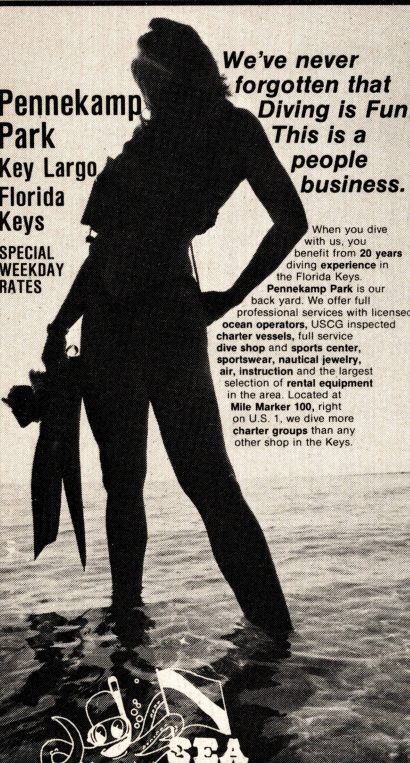
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CURACAO

picturesque fishing boats; West Point Bay, probably the most popular; and Knip Bay which is the beautiful beach featured in the Curacao travel posters and advertisements.

The Netherlands Antilles are all of special interest to U.S. tourists because of their political, social and economic stability and because of the Dutch influence of cleanliness and enterprise.

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Although a very cosmopolitan island, English is spoken everywhere on Curacao and U.S. credit cards and currency are readily accepted.

Also highly recommended is ALM airlines, the national carrier of the Netherlands Antilles. There are daily, direct flights to Curacao from Miami and inter-connecting flights from other major cities. This airline has a wonderful reputation for service, efficiency and courtesy.

For divers who are looking for new frontiers but want comfortable and interesting surroundings, Curacao will provide unexpected pleasures and a memorable vacation with a Dutch touch. For information call or write the Curacao Tourist Board, 685 Fifth Avenue, New York, New York 10022; (212) 751-8266. A new, full-color diving brochure on all six Dutch islands, written and photographed by this author, is available from ALM airlines: 97-77 Queens Blvd., Rego Park, NY 11374; or 1150 N.W. 72nd Ave., Miami, FL 33126.

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BOMBER BELOW

(Continued from Page 77)

41-30118. Raymond Zimmerman died in the crash and the plane became his grave. Lieutenant Colonel Williston Cox was sent to Rabaul and survived the war, but little is known of the exact fate of the other crew members, although two were later identified by dental records and remains found in graves in Madang.

The plane lost its port engine before coming to rest on the reef but is otherwise in one piece. The wings and tail are still firmly attached and laden now with coral gardens as they jut out into the blue water. It may be in its grave, but to a diver, it lives! Nature's miracle has transformed this fallen warrior into a wondrous spectacle. Seafans and scarlet sea-whips decorate the Mitchell, while technicolor sponges and delicate soft corals have long since healed the scars of battle. Damsels, butterflies, coral cod, trumpetfish and dozens of others have made the wreck their home, presenting an astounding and vital display of harmony and beauty. On one dive I tried to count the different species but gave up after topping 200.

The combination of the tragic circumstances of the wreck and the profusion and glory of the marine life made my first dive an emotional experience. I could understand Dave's excitement when he told me of his discovery just a few hours before. Incredibly, within two weeks, unknown divers had ripped out two of its 13 guns, desecrating its previous integrity. From my anger on seeing this I knew what started wars! There is a saying among divers that if you find something in your yard it is junk but if you find the same thing underwater it is treasure. Ironically, unless pillaging divers are experienced, they do not realize that by bringing a souvenir to the surface they are usually guaranteeing its destruction because it corrodes rapidly on contact with air.

Fortunately, the government of Papua New Guinea has realized the historical value of its underwater heritage and has declared a moratorium on all collection, removal and export of war relics.

Since the discovery of the Mitchell, another intact bomber has been discovered near the nation's capital of Port Moresby. This one turned out to be a Boston Havoc and is also in excellent condition, having been ditched after its port engine took a direct hit. Doubtless there are many more planes and ships from the war unseen in Papua New Guinea's underwater paradise.

For those interested in diving the Mitchell bomber, trips are being run by Tropical Diving Adventures Pty. Ltd., P.O. Box 1644, Boroko P.N.G. who have a branch at Madang Resort Hotel. >

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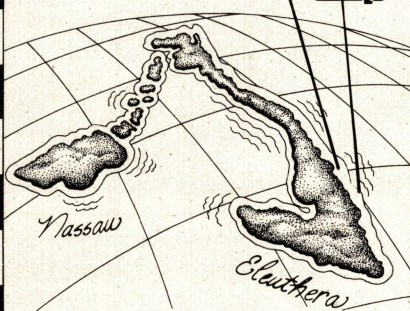
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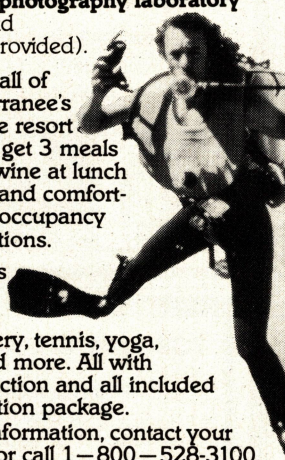
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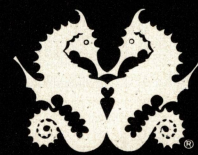
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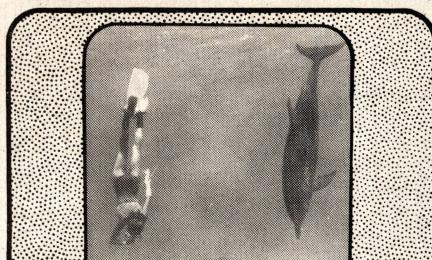


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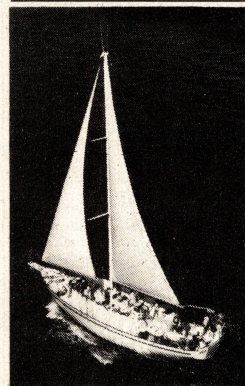
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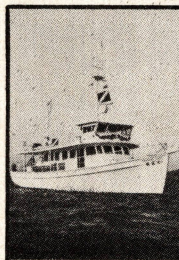


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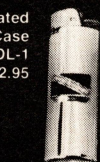
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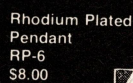
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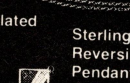
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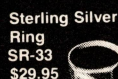
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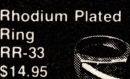
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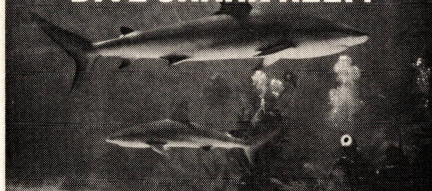
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THE MAGNUM

(Continued from Page 55)

specially shaped curve. Initially, a point far out on the lever is in contact with the diaphragm, giving the lever greater mechanical advantage, and reducing the cracking effort (i.e. the effort needed to open the valve initially). As air starts to flow, the venturi effect begins to take place, the diaphragm is sucked in further, and the lever's contact point moves in, decreasing the mechanical advantage and making the valve less sensitive to diaphragm movement (in order to prevent the venturi effect from getting too carried away).

PERFORMANCE

Admittedly, the design features sound good. But how does the Magnum's performance stack up in actual use? Unfortunately, the Magnum was scheduled to be tested by the U.S. Navy Experimental Diving Unit after this article had to be submitted. I anxiously await the results. If my own evaluation is any indication, however, the Magnum should do pretty well.

In the water, I experienced no unusual free flow problems with the Magnum. It only seemed to free flow when the second stage was full of air and the mouthpiece turned up — then it would flow, continuously, but not violently. Turning the mouthpiece down stopped the air flow. In other positions, whether full of air or flooded with water, the second stage did not exhibit any free flowing.

Breathing from the Magnum required very little effort. In the head-up position (i.e., looking horizontally), inhalation resistance was relatively low, and seemed to get even lower when looking down. No noticeable change occurred in the resistance when I rotated my head 90 degrees to the right or left, nor when I moved into the head-down (standing on my head) position. In this last position, no water entered the second stage. Even on my back, looking up, no water entered, although inhalation did get a little harder. From dainty sipping to excessive inhalation, relatively little effort was needed. Similarly, exhalation resistance was reasonably low throughout the range from light to very heavy exhalations. Some, but not much, resistance was felt in the normal, head-up position. And, this did not change significantly in the face down position, when I turned my head right or left, nor while I was standing on my head. Exhalation, however, did become easier when I was on my back, looking up. During the evaluation, no strange behavior nor idiosyncrasies were observed. The Magnum performed well, with no problems.

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All things considered — design, construction, performance and easy maintenance — this should be a very good regulator for normal sport diving use, and should really prove its value when used in cold or dirty water. The Sherwood Magnum sells for \$185. See your Sherwood Selpac dealer for more information. 

RIDING ROCK INN PHOTO COURSES

Dick Batchelder, president of Columbus Landings Service Co., has set the schedule of advanced underwater photography classes to be held at the Riding Rock Inn on San Salvador Island in the Bahamas. Dates for these seven day courses are: June 19-26; July 3-10; and Aug. 28-Sept. 4. Entitled Advanced Underwater Photography/Program I, these comprehensive training courses are available to both beginning and experienced underwater photographers. Classes are taught on a multi-level education system under close personal supervision of a training staff of four instructors.

Student applicants need only bring a basic Nikonos camera or rent one for the duration of the course. All other photographic equipment is furnished on a no-cost basis. Accessories include: mini-strobes, wide-angle strobes, macro tubes, close-up lenses, wide-angle lenses and lightmeters. Each student is also provided with their own personal tool kit, lightbox, and slide mounting kit for the duration of the course. Color slide lectures, underwater photographic assignments and photo critiques are done on a daily basis. Student's color film is processed within hours after the dives for same day review. Students are presented with an underwater photographer certification at the end of the program.

For more information, brochures and application forms, contact the Travel Department at Columbus Landings Service Co., P.O. Box 1492, Ft. Lauderdale, FL 33302. Or, call toll free (800) 327-2724. For Florida and Canada residents call (305) 524-4629. 

LARSEN TO CAYMAN

John Larsen is the new general manager of the dive operation at Spanish Cove, Grand Cayman.

Prior to his move, Larsen had spent nearly 15 years as an active and professional participant in the dive industry. A NAUI instructor since 1970, Larsen was director of the Colonnades Undersea Center in West Palm Beach, Florida until 1978. Larsen was the owner and operator of a dive charter boat operating in West Palm Beach and the Bahamas from 1978 to 1981.

For more information on the new Spanish Cove, write to John Larsen, Spanish Cove, P.O. Box 1014, Grand Cayman, B.W.I.; or call (809) 949-3765. 

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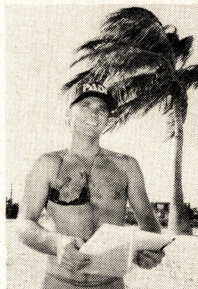
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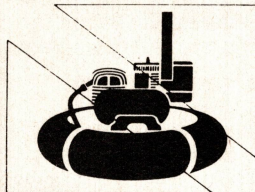
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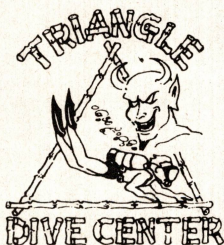
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Scuba Systems Tank Bag

BY BONNIE J. CARDONE

When you look at this product your first reaction is likely to be, "What a neat idea!" and your second, "Why didn't someone think of this years ago?" It's a simple device, designed to protect the one piece of equipment that lasts the longest, gets the least care and takes the most abuse — your scuba tank. Tanks are built to last and take rough treatment, of course, but they are not immune to dings and scratches. Steel tanks can even rust on the outside, even if they are epoxy coated (and especially if chunks of the coating have been scratched off). If you want to keep your tank looking like new you'll appreciate Scuba Systems tank bag.

Designed to protect your tank, the



bag also provides a handy way to carry it. Cylindrical in shape, it has a full length, heavy-duty YKK nylon zipper, a pair of nylon webbing handles and an adjustable, padded, nylon webbing shoulder strap, with nickel finished D-rings and snap hooks. At the top of the zipper there are mating Velcro strips that close the bag neatly. The carrying handles are held together with a piece of material that wraps around them and has Velcro strips for closure. The shoulder strap pad can be removed or repositioned easily because of its Velcro closures.

Getting the tank into the bag can be quite a production unless you use the following method: Unzip the bag and lay it on the floor, zipper side up. Holding the tank by its valve, roll it onto the open bag; slide the bottom of the tank into the bottom of the bag; pull the zipper up; press the Velcro strips together.

The bag fits either a 72 or 80 cubic foot tank; but if the 80 has a boot on it you'll have to remove it, otherwise the zipper cannot close.

The inside of the bag has a water-proof coating. If you put a wet tank in it the dampness will not soak through and soak you while you're carrying it. Three



brass grommets on the bottom of the bag allow water to drain.

A year-old subsidiary of a company in St. Louis, Missouri, Scuba Systems also makes nine other bags. There are basic gear bags, mask and regulator bags, and a garment bag, as well as a wallet and baseball hat. All of these products are made to military specifications and are top quality. Scuba Systems guarantees its products will be free of defects in material and workmanship for as long as they are owned by their original purchasers. When you examine the tank bag carefully, you can see why the company can make such a unique promise: The bag looks as if it will last forever. All seams are double stitched (stress areas are triple stitched) with nylon upholstery thread. The 11 ounce DuPont Cordura is stronger and more durable than vinyl or cotton duck, according to the company. Cordura looks like canvas but has the lighter weight and superior strength of nylon. Nylon webbing reinforces the bag at strategic places.

All of Scuba Systems' products are available in black only. Raymond Kohout, Scuba Systems' national sales manager, says this is because a survey showed that dealers were tired of selling varied colored bags; they wanted bags in one basic color.

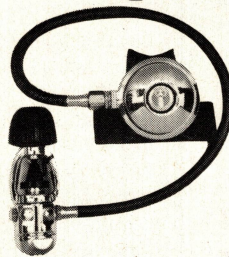
Items made of Cordura are easy to care for — simply rinse with fresh water and let dry. The material does not fade or get stiff and it is incredibly sturdy.

The Scuba Systems tank bag sells for \$45 and is available at local dive shops. For a free brochure of products or more information write: Scuba Systems, 826 Horan Drive, St. Louis, Missouri 63026-2478.

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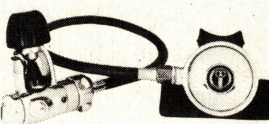
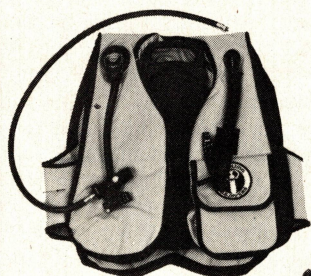
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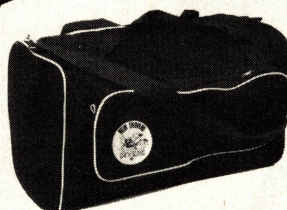
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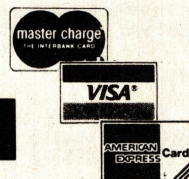
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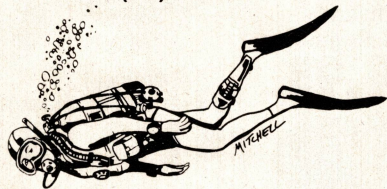
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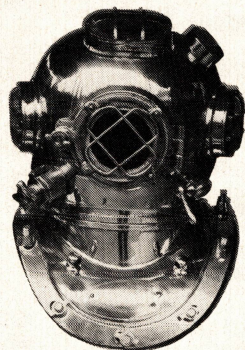
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DOLPHIN ONE MOVED

The *Dolphin One*, training vessel for Divers Unlimited of Hollywood, FL, has moved its base of operations from Ft. Lauderdale to Key Largo. The move allows the instructional programs at Divers Unlimited and Underwater Careers International to conduct all open water training activities on the beautiful reefs of Pennekamp Park. The most popular dive sites within the park are all within a 30 minute run from the dock. The *Dolphin One* is Coast Guard documented for 22 divers and is skippered by a long-time Keys personality, Capt. Bill Pugsley.

In addition to diving the usual spots within Pennekamp, the boat specializes in trips not on the itinerary of other local operators. Deep dives, drift dives, and spearfishing trips are scheduled monthly to give even the most seasoned Keys diver an interesting change of pace.

The *Dolphin* is open for charter during weekdays, and recently initiated a special open water check-out program for instructors. Under this program PADI Instructors may book students on the boat at a special rate well below the usual ticket price with no minimum number required. The instructor's ticket is, of course, complimentary. This allows instructors to conduct open water training in Pennekamp Park at a profit even with small or private classes.

For further information on the *Dolphin One*'s instructor program or open charter dates, contact Divers Unlimited, 6023 Hollywood Blvd., Ft. Lauderdale/Hollywood, FL 33024; (305) 981-0156.

AQUA-CRAFT SOLD

Aqua-Craft, Inc., of San Diego, California, the oldest diving accessory manufacturer in the U.S., has been sold to Roy



H. Slavin. He has assumed the position of president and chairman of the board at Aqua-Craft.

Dan Walsh was recently promoted to the position of marketing manager. He will supervise the marketing, sales operations and research and development departments. In the weeks ahead, Dan

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will be traveling with each of Aqua-Craft's sales representatives; affording him the opportunity to meet many dealers first-hand.

Ed Schroeder, formerly accounting manager and controller at Aqua-Craft, has been named its chief financial officer.

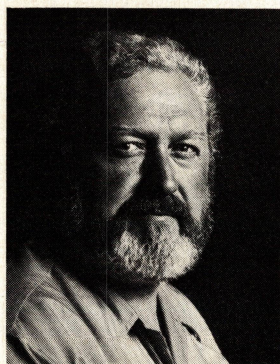
John Magnin, who served two and a half years as sales operations supervisor, has been appointed foreign export manager.

Cathy Smith, former assistant to the president, has assumed the position of sales operations supervisor and inventory controller.

Aqua-Craft is located at 7992 Miramar Road, San Diego, California 92126. The phone number is (714) 271-7000. 🐠

AL POPP MEMORIAM

Alfred L. Popp died peacefully in his sleep on Sunday, December 6. Beginning in an era when dive equipment was mostly do-it-yourself, Al's career in the



dive business spanned 24 years. He represented numerous manufacturers as their East Coast sales representative. Al was also a PADI master instructor (M-30) and a NAUI instructor. Many divers and instructors in the New England area owe their interest in diving to Al's guidance.

Known as much for his human understanding as for his diving and salesmanship, Al leaves behind many friends. He is survived by his wife Maurine, eight children and six grandchildren. 🐠

BAJA EXPEDITION

Jim Stewart, diving officer at Scripps Institution of Oceanography and Dr. John De Martini of Humboldt State University will be expedition leaders on a dive trip to the islands off the outer coast of Baja California August 24-September 2. Visiting Cedros, San Benitos and Natividad islands, the trip will be aboard the *Sand Dollar* out of San Diego, CA.

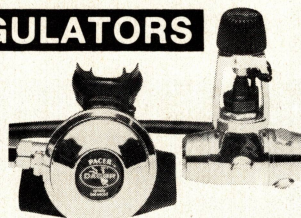
The trip is limited to 15 divers and the price is \$850 for the ten days including everything (based on the *Sand Dollar's* departure and return to San Diego).

For information contact Dan Gotshall, Sea Challengers, 1851 Don Avenue, Los Osos, California 93402. 🐠

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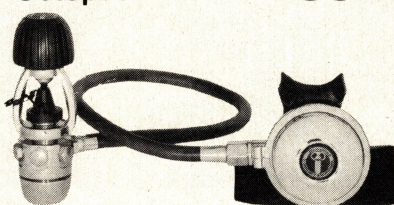
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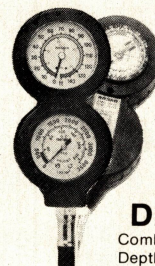
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50 cu. ft. alum. tank w/"K" valve.

Reg. retail \$174.

Steele's \$99⁹⁹



U.S. DIVERS CONSHOLF XIV REGULATOR

Balanced diaphragm 1st stage.

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Max. depth console w/knife.

Reg. retail \$184.95.



Steele's \$119⁹⁹

Steele's \$124⁹⁹

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420 nylon stabilizing jacket w/rapid exhaust valve, power inflator & Seaband backpack. Med. or Lg.

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1/8" GLOVES—Nylon 2 sides, double glued, stitched in and out.

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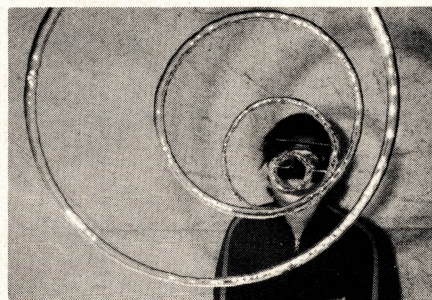
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Just 50 miles south of San Francisco

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BUBBLE RINGING

Minoru Yamada and Masashi Takahashi of the Japan Marine Science and Technology Center have perfected the art of blowing bubble rings underwater. The principle involved is similar to that of blowing smoke rings. Shaped like a



doughnut, the rings spin rapidly and expand as they rise. Often, when two rings are made in series, the second ring will overtake the first and pass through it. If two rings are produced side by side, they combine and form a larger ring.

Yamada and Takahashi have developed equipment which can produce the bubble rings automatically, and they believe this could have applications in art and industry.

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New, colorful, neoprene armbands from PADI provide instant diver or student identification, above or below the water. The red, blue or orange armbands have an imprinted logo. By using an indelible marker on the white background logo; diver numbers, letters, or buddy team numbers can be permanently placed on the armbands. Boat safeties, beachmasters, teaching assistants and instructors will be able to easily identify individual divers, or buddy teams wearing the armbands. For information about this exciting product (#60222 cost: \$25/set of 10) contact: PADI Headquarters, 1243 E. Warner Ave., Santa Ana, CA 92705; (714) 540-7234.

47th STREET UNDERWATER PHOTO COMBINATIONS

May 1982

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110 CAMERA

Waterproof, floating, w/built-in electronic flash

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NEW FUJICA HDS

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w/35mm

Nikon

Lens



\$319.95

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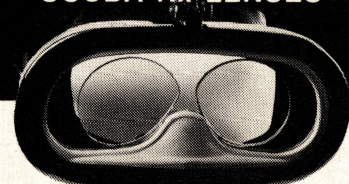
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CEDAM EXPEDITIONS

CEDAM International, a non-profit organization that has placed the sport of diving and the talents of its members at the service of country, science and humanity, is prepared to welcome new members into its ranks to participate in its 1982 scuba diving expeditions to Chinchorro Bank, Mexico and Drakes Bay, California.

The Chinchorro Bank expedition will take place July 2-14. Cozumel or Akumal, Mexico will be used as a staging area to explore an eighteenth century wreck, the *Nuestra Senora de Guadalupe* (1772). Also included will be further exploration of the 40 Cannon wreck site for possible recovery of cannon for the CEDAM Museum.

The Drakes Bay (Point Reyes, San Francisco) expedition will take place October 9-22. Exploration of the site of the Spanish Manila galleon *San Agustin* (1595) will be undertaken. Dr. Hal Ross and the underwater habitat, Tektite, will join forces with CEDAM and the National Park Service, Western Region, on this ambitious project.

A tax deductible contribution to CEDAM International confirms your reservation and helps cover the cost of mobilizing the expeditions. Divers on each expedition will be provided with hotel room (double occupancy), all meals, boats and support vessels, dive instruments, air, guides and standard scuba gear (in case personal items are lost or are in need of repair). Air fare and travel expenses are not included.

For more information contact: Bernarr Macfadden, CEDAM International, P.O. Box 224046, Dallas, TX 75264.

MONTANA SPEARFISHING

The Montana State Divers Council is seeking help and support in changing the spearfishing laws in Montana. The Montana State Divers Council is the coordinating organization for the dive clubs in the state. The council was developed to promote diving in Montana. With the increasing success of its annual Dive Festival, it is trying to liberalize the spearfishing regulations in Montana.

Presently the regulations only allow spearing of non-game fish by swimming or submerged fishermen. The Council would like to see the regulations changed to allow spearing of game fish. It is considering asking for possession limits that are less than the limits for line fishermen.

The council would appreciate any information divers can provide on spearfishing, especially in fresh water. References or studies on the effects of spearfishing, on line fishing and fish populations would help greatly. Copies of regulations from other states or countries could also be useful.

For information contact the Montana State Divers Council, 300 Vine CL #6, Dillon, MT 59725.

BULLETIN: DIVERS

For years it has been an accepted practice by trade schools to charge students for the length of time they put into a program if they should change their mind and drop out after the first few weeks. This has proven to be an expensive and frustrating experience for the individual involved.

Commercial Diving Center, the diver training division for Oceaneering International Inc. has announced an unprecedented no-risk 30 day full refund guarantee which will eliminate this risk for the incoming student. The guarantee, which the applicant receives in writing, becomes effective immediately.

Commercial Diving Center's parent company, Oceaneering International, Inc. is the world's largest contractor providing underwater services to offshore oil and gas producers worldwide. Oceaneering International, Inc. maintains 34 offices in 17 countries and has an urgent need for qualified divers.

Because of this, Commercial Diving Center's selection and screening processes and high rate of student employment have set standards of excellence for the entire industry.

This new refund policy reflects Commercial Diving Center's sense of obligation to both the student and the diving industry to make sure that each graduate is fully qualified to be employed as a satisfied, productive commercial diver.

Information on this exciting new no-risk trial period of training can be obtained by calling the school collect at 213/834-2501.

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Shock Resistant
Oil Filled
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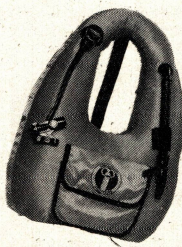
FARALLON MASK
Wide tri-vue.
String loaded strap
Minimum displacement
FARALLON MASK \$29



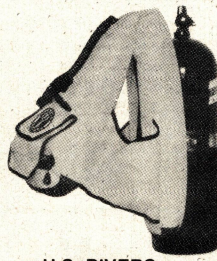
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Neptune's Underwater Discounts

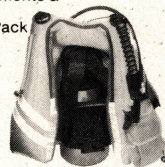


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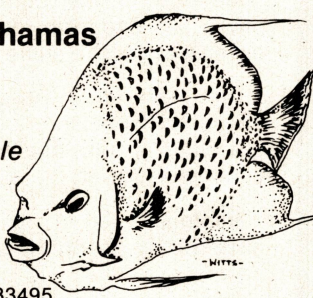
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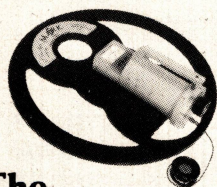
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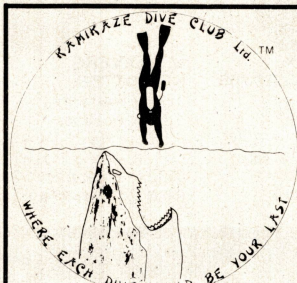


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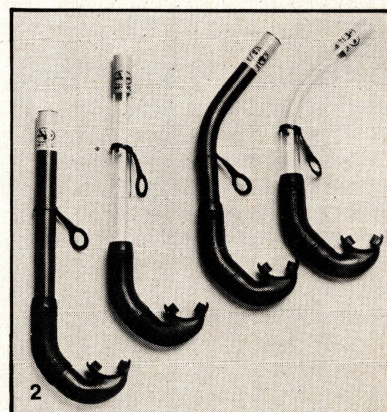


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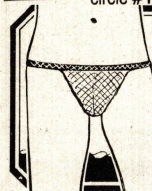
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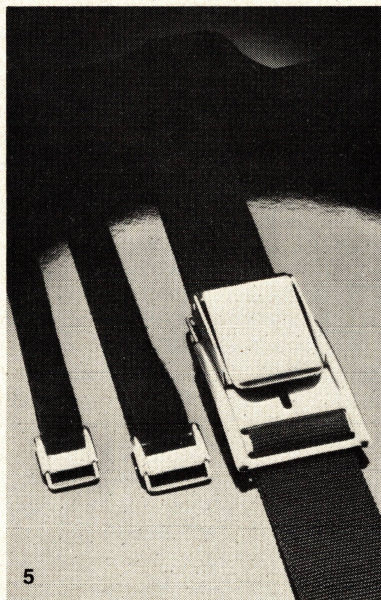
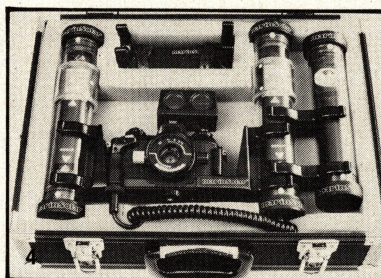
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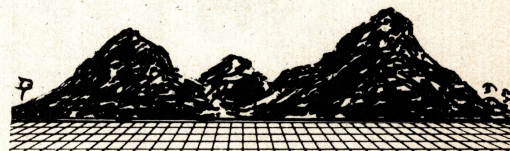


3 Dive Watch—The Twin Time watch features a combination of analog and digital readout of the time of day as well as a digital readout of bottom time up to 59.99 minutes. The one-way bezel has click stops. Water resistant to 600 feet. \$345. From Heuer, 960 S. Springfield Ave., Springfield, NJ.

4 Photo System—Includes revolving turret strobe and slave, modeling light, connector cord, all brackets, leg sheath, stereo viewfinder, and black aluminum case. Designed to work with the Nikonos cameras (specify II/III/IV). Items available separately. Marin Solar, P.O. Box 810704, D-8000 Munchen 81, W. Germany.

5 Self Tightening Buckles—These buckles expand and contract automatically with muscle movements and wetsuit compression. Weightbelt buckle has two inches of internal travel and comes on black nylon webbing. Smaller straps are Velcro. Buckles and springs are stainless. \$6.95 small, \$28.95 large. From Tekna.

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ser. E lens.....	169.95
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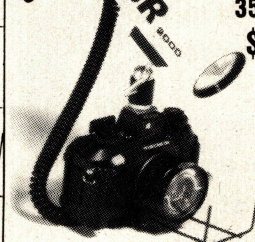
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**Nikonos IV w/
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\$335.00**



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Add \$5.00 Postage & Handling SORRY, NO C.O.D. (\$7.50 Canada, plus currency exchange) Clip and Mail This Handy Coupon Today! To: Skin Diver Wet Suits
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City _____ State _____ Zip _____

RIDING ROCK RESORT

(Continued from Page 86)

where pure white sand comes right to the lip of the drop-off before cascading over the edge. Visibility is crystal clear and this drop-off is loaded with all types of coral and macro creatures. A real surprise is the discovery of **Cockburn Town Pier** as a lively spot for night dives. This spot can be dived right from the beach and visitors are likely to encounter many bizarre night creatures such as octopus, rock lobsters and stingrays. Another recent find is **Cable Crossing**, a tightly packed coral ridge and drop-off in the vicinity of the island's communication cable. This spot is loaded with all types of marine life. The divemasters have recently discovered a vast underwater cave complex in the center of **Gardner's Reef**. As yet, the location has not been named.

GETTING THERE

Making reservations and getting to the Riding Rock Resort is a fairly simple procedure, providing you have all the right phone numbers. There is a stateside office in Florida which operates under the name of Columbus Landings Service Company. The office is right at the Ft. Lauderdale airport on the side opposite the commercial air terminal.

You can obtain information or make hotel reservations by either writing or calling the Travel Desk, Riding Rock Inn Resort, P.O. Box 1492, Ft. Lauderdale, FL 33302. The U.S. toll free number is (800) 327-2724. If you call from Canada or Florida, the number is (305) 524-4629.

Charter flights from Ft. Lauderdale to the Riding Rock Inn Resort are scheduled every Saturday morning at 11:30 am. The flight takes approximately two hours and goes directly to the island non-stop. The island has its own international customs and immigration office for convenient entry. Return flights depart from the island every Saturday afternoon, thus providing visitors with a full week of vacation living, including six full days of diving. The Riding Rock Inn is living proof of the advertising slogan: "You're not getting older, you're just getting better."

CHET KING TO QUABBIN

Chester "Chet" King has joined the staff at Quabbin Dives. Chet will function as senior divemaster and head the scuba instruction program. An active PADI instructor and BSAC trained compression chamber operator, Chet has over three years of diving experience in Grand Cayman. Quabbin Dives, owned and operated by Caymanian scuba instructor, Atlee Evans, specializes in scuba

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3. What size is it? A ☐ 8-10 Ft B ☐ 11-20 Ft
4. What size motor do you have on board your inflatable boat?
1 ☐ 2-4 HP 3 ☐ 12-24 HP 5 ☐ Do not have a
2 ☐ 5-10 HP 4 ☐ 25 HP and over motor on board
5. Do you use your inflatable boat for diving?
A ☐ Yes B ☐ No
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4. What size motor do you have on board your inflatable boat?
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5. Do you use your inflatable boat for diving?
A ☐ Yes B ☐ No
6. Did you use your boat to travel any long distance
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See & Sea Travel, Inc. of San Francisco will conduct a NAUI advanced open water course aboard the *Cayman Diver*, Grand Cayman, October 16-23.

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For further information, contact See & Sea Travel, 680 Beach Street, San Francisco, CA 94109; (415) 771-0077. 🐠

RX FOR DIVERS

(Continued from Page 20)

not taking medicines which block your capacity to exercise.

ANOTHER ISSUE

Cheryl Knudsen asks about diving with diabetes that requires daily insulin injections. Our answer at present and after several long discussions with other physicians involved in diving is a blanket no. Although there are known effects of pressure on glucose or insulin action at scuba diving depths, our concern is the risk of hypoglycemia underwater and the strong possibility of you and your dive buddy both drowning. We would like to hear from some knowledgeable diabetes specialists who are divers on whether we can make exceptions and how to select and treat diabetic divers to guarantee against an underwater accident. 🐠

As Long As You're Diving, Go for the Gold!

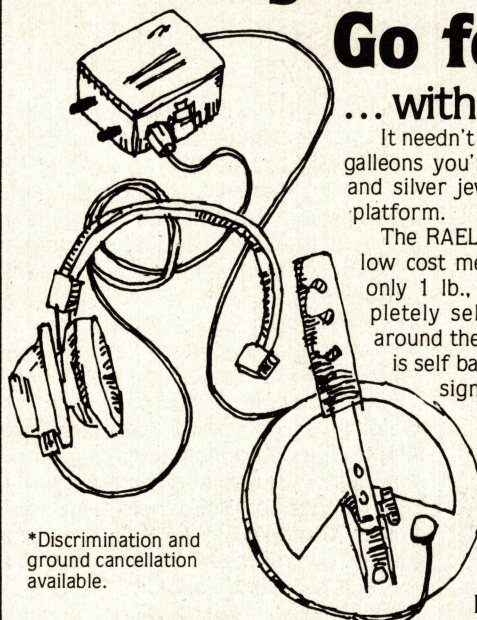
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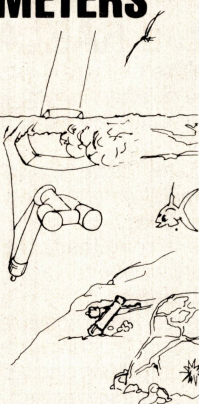
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HELL DIVERS FESTIVAL

Hell Divers Scuba Diving Club, a New Orleans, Louisiana based diving organization, will hold the 19th Annual Hell Divers Diving Festival — South's Largest Spearfishing Competition on Sunday, June 6 at the newly completed Lafreniere Park in the heart of Metairie, Louisiana.

Registered divers will have four days of spearfishing competition, June 3-6, with weigh-ins and festivities at Lafreniere Park on Sunday, June 6.

The public is invited to witness the weighing-in of sharks, barracuda, and eight other categories of fish speared in the Gulf of Mexico and surrounding waters. Attendees will also help in the selection of Miss Hell Diver 1982, and to salute the divers who take the largest fish in the four day competition.

Thirty-three trophies will be awarded winners in the spearfishing competition and events. King Spearfisherman, Queen Spearfisherwoman, and Winning Club trophies will be awarded, including 1st, 2nd and 3rd in ten categories.

Divers interested in competing contact your local dive shop or the Hell Divers Scuba Club, telephone (504) 833-1884 or (504) 834-7902.

RESORT INSTRUCTORS WANTED

Rum Cay Diving Club, the newest dive facility in the southern Bahamas, has instructor/divemaster positions immediately available for qualified applicants. Those who apply must be certified dive instructors with experience in underwater photography and E-6 processing. The applicant should be single and have prior experience with a resort island operation.

Applicants may send their resumes to: Tom Ebro, Rum Cay Diving Club, 951 Nautilus Isle, Dania, Florida 33004.

SUBAQUA SCENE

Only five years old, the British dive magazine, Subaqua Scene, already has most of Britain's 50,000 divers reading it. Many divers from other countries read it as well. Subaqua Scene gives up-to-date news and views on diving in the United Kingdom and abroad.

Subaqua Scene is the official magazine of the Sub Aqua Association. The association is composed of over 350 dive clubs with more than 10,000 actively diving members.

For more information about Subaqua Scene, the SAA, or about diving in the U.K., contact: Len Charlton, 168 Victoria St., London SW1E 5LB, England; telephone 01-828-4551.

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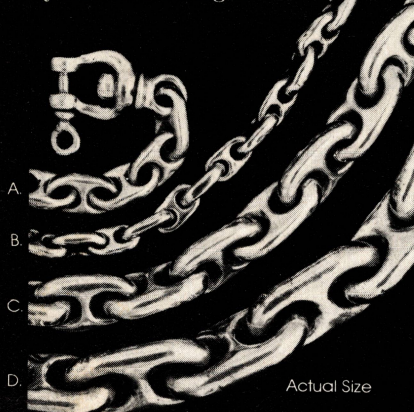
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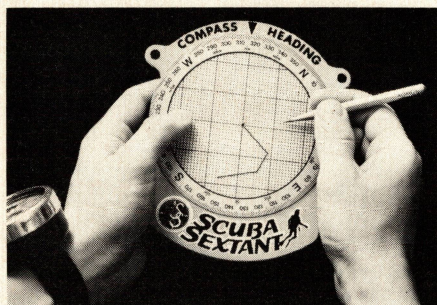
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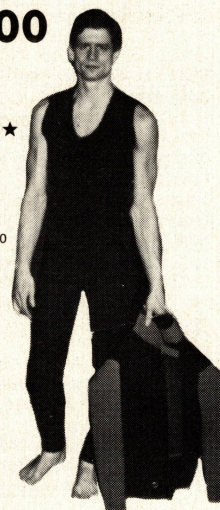
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2104 W. Oakland Park Bl., Ft. Lauderdale, FL 33311	305/735-6227
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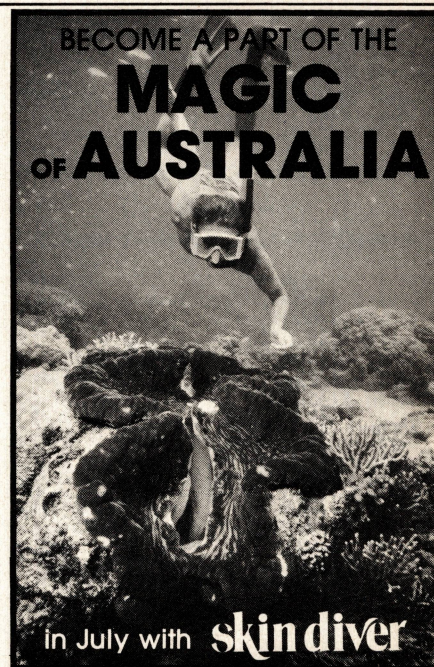
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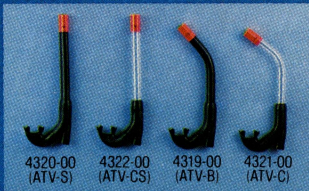
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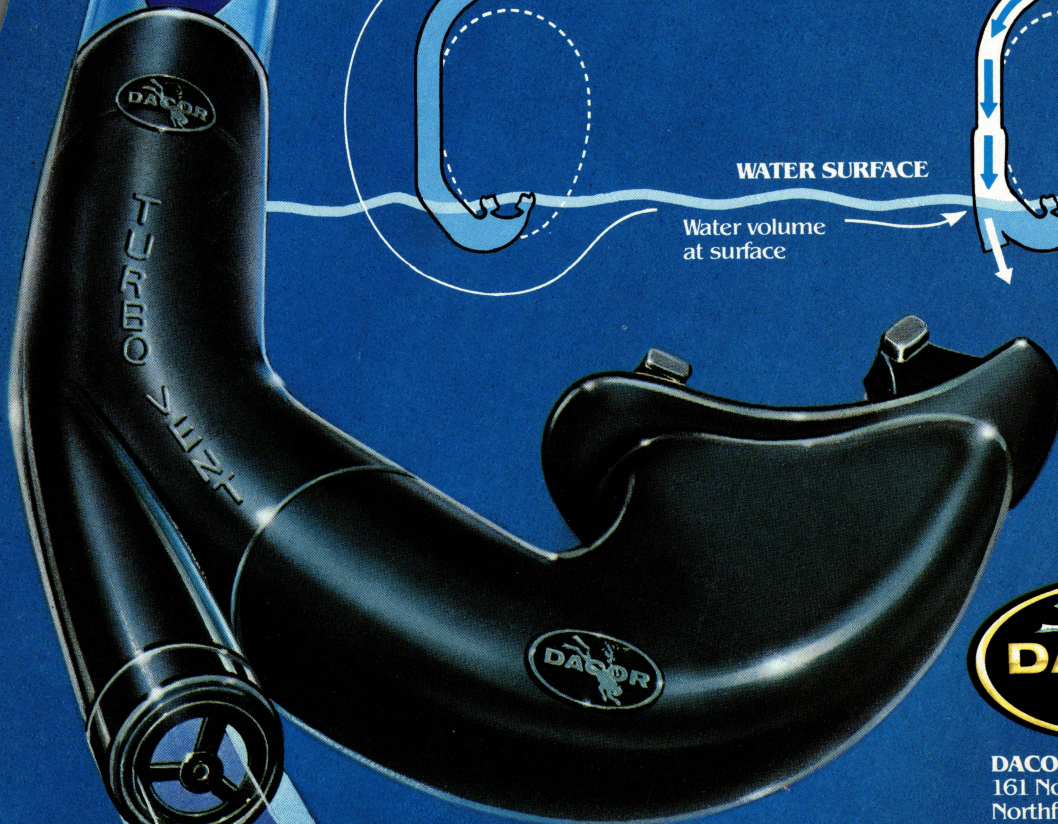
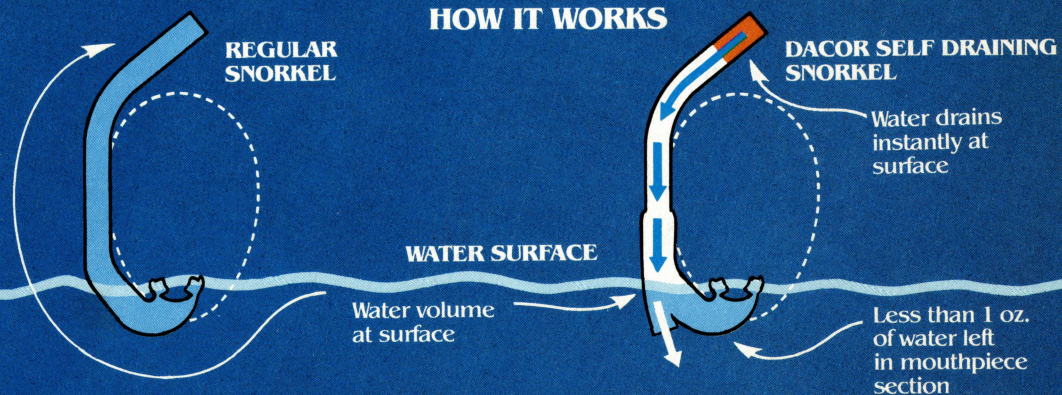
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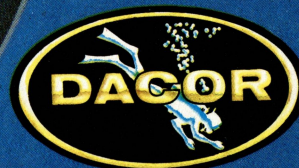
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Chairman of the Board